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Steel Foundry Practice at Schenectady

Segment Patterns and Core Work Extensively Used by General Electric Co.—Chipping and Machining Lessened by Reduction of Risers and Webs

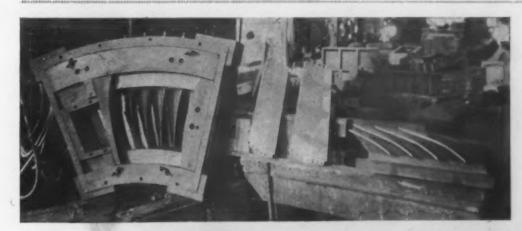
BY L. S. LOVE

HE steel foundry at the Schenectady Works of the General Electric Co. is not considered a production foundry. The building was originally designed for a gray iron molding machine foundry but, shortly after it was opened as such, steel, melted and refined by electricity, began to loom up and a small furnace was designed and built in one corner of the building where experiments were carried on for several months. And, as the possibilities of light steel castings grew, the experiments were pushed ahead and finally a small

tilting furnace of 2½ tons capacity was installed and casting of steel put on quantity production basis. As the field broadened and the demand for this kind of castings increased, the casting of iron in this building was gradually abandoned. The building was finally turned over to the production of steel castings exclusively. Some remarkably interesting work is turned out in this foundry.

out in this foundry.

The foundry is equipped with two electric furnaces of the Heroult type; one of 6 tons and the other of 5



NICKEL
Steel Diaphragm Blades
Covered with
Grease Are Set
by Micrometer
in the Core Box
and Become an
Integral Fart of
the Oil Sand
Core Segment

TURBINE
Diaphragms
Are Made in
Match Molds
Poured at the
Center with
Metal Flowing
Under the Cores



tons capacity. It is possible to melt in these two furnaces and have both heats come out at the same time, making it practicable to cast a mold taking upward of 15 tons. In 1923 they melted 6230 tons to produce 3216 tons of good castings.

The making of nozzle diaphragm castings is one

The making of nozzle diaphragm castings is one of the outstanding features of this foundry. The mold is rammed in the ordinary way and gated at the center. The steel is carried to the outer ring through gates running under the cores. Segment cores are made in core boxes, built accurately and having metal space

blocks which keep the blades at exactly the right dis-

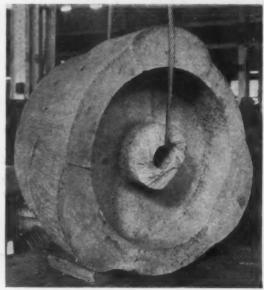
tance apart while being rammed. Once the core is rammed up and the box and loose pieces removed, the distance between blades is checked by an inspector using micrometer callipers, and again after the cores have come from the oven. The final check is made after the casting has been cleaned and chipped. These blades are made of nickel steel and extend through the core on either end from 1 in. to 1½ in. The ends of each blade have anchorage holes cut in them through which the molten steel runs. These ends are coated lightly with red lead.

Five sink heads are used on the outer rim of the

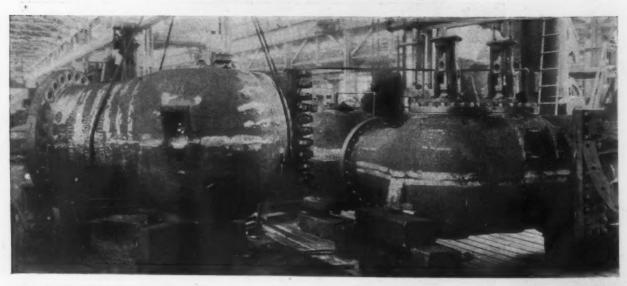


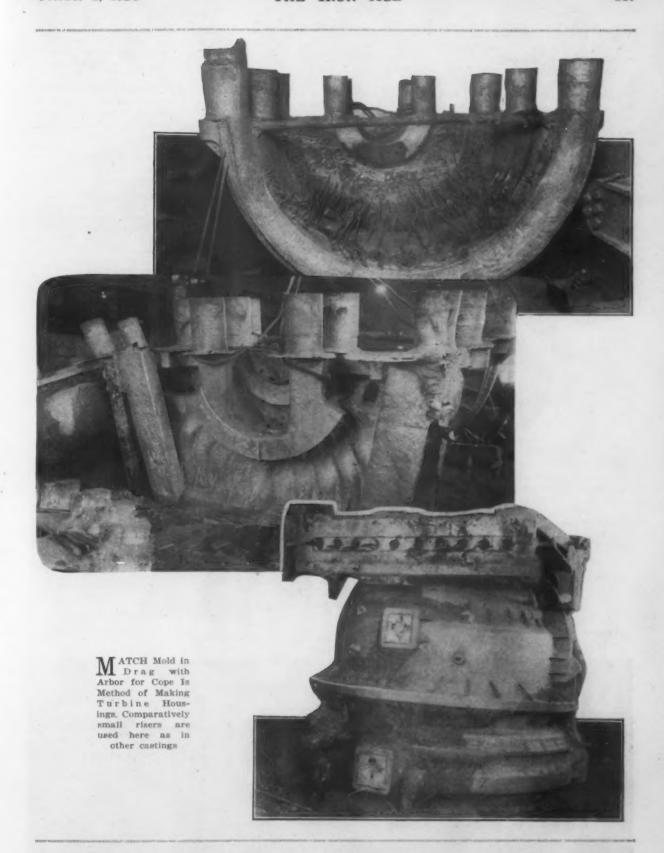
ROTOR Spiders
(Upper) for
Motors and Generators Are Made
with Segment Patterns, One core box
is used for hub and
arm portions. Small
risers are clearly
shown, as is the
continuous riser on
the hub. The casting at the left is a
control valve body
showing small
risers, freedom from
webs and gate at
bottom and midbody

Castings (Center)
from Outside Foundries Are More
Costly to Machine,
Owing to Large
Pad Under Each
Riser



M INIMUM Chipping (Lower)
on the Cleaning
Floor Is Required
for the Schenectady
Control Valve Body
Casting (Right) as
Compared with the
Same Pattern Casting
Made Outside
(Left)





diaphragm casting, generally 6 in. in diameter, and two 10-in. heads are used on the web to insure a sound casting. These sink heads are removed by oxy-hydrogen torch in the cleaning room. Castings are left in the sand for from 24 to 36 hr. Pouring the molds is facilitated on some types of diaphragms by tilting the mold and pouring at an angle.

Typical of the practice of using segment patterns and one core box is the making of rotor spiders of the arm or web type for large motors or generators. One of the illustrations shows two of these spiders on the shaking out floor, the positions of the two showing each end of the castings. It will be noted that there are eight arms in the one presenting the

bottom of the casting. These arms are 5 in. by 10 in. oval section and have four brackets 4½ in. wide by % in. thick where they join the arms and ½ in. thick at the edge. These brackets are chipped off in the cleaning room.

This casting has a rim with 32-in. face, 7 in. thick and 72 in. diameter, the hub measures 34 in. in diameter with a 20-in. core making a 7-in. wall. The outer face is made with a segment pattern and one core box makes the arms and hub. The hub carries a continuous riser with center core extending through it. The riser is 1 in. larger than the hub. Six 14-in. risers are used on the rim and all are 30 in. high. Two sleeve core gates are used, one at the bottom and one half

way up the rim. The molding time on this job is 8 hr. for one molder and two helpers, and two days for one core maker and one helper; for the cover and closing the mold ready to pour one molder and one helper 15 hr. The casting weighs 9 tons cleaned.

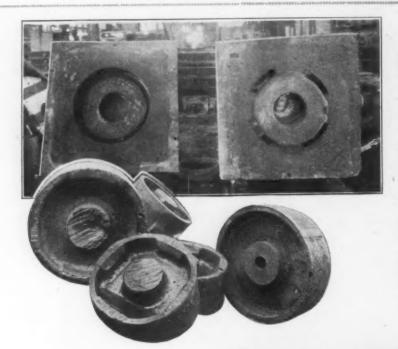
The same type of casting, with 6-in. web instead

The same type of casting, with 6-in. web instead of arms, is made with an extra piece 1 in. thick in the core box for cope part of the mold to allow 1 in. all around inside for feeding purposes. In this case

king of certain turbine castings. The illustrations show one example of a casting made in a drag 12 ft. by 10 ft. by 6 ft. deep; the match mold using an arbor for cope, tie bars being cast across the open side or top of castings.

top of castings.

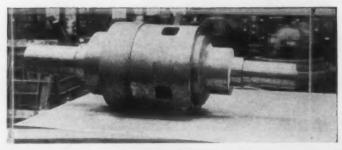
Turning aside from large castings to smaller ones made at this foundry, and they are made as small as 4 lb., one finds several interesting examples of foundry practice, which not only save foundry work or cost

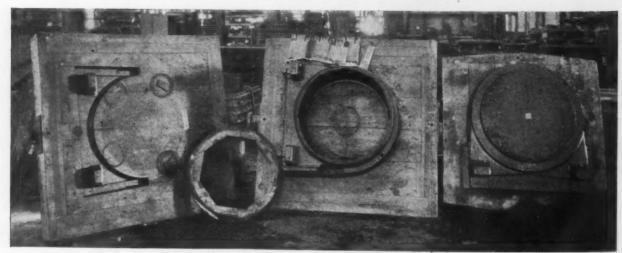


ARGE Brake Wheels (Left), Formerly Made with Cast Hub, Plate Web and Rolled Rim, All Welded, Are Now Made of Solid Cast Steel. The castings have four shrinkage pads in the inside of the rim. Metal is poured through hub to a brick at bottom of mold and flows through four gates under the core to the rim. Welded wheel as formerly made appears at extreme right

Elevator Motor Shafts
(Below) Are Now Cast
with Rotor Core Integral,
the Casting Being Hollow
for lightness. The smaller
journal at right is solid,
but the cavity extends
through the journal at the
left

A NEW Type of Pattern Which Makes Its Own Core (Right), Is Much Simpler, Has Fewer Parts and Permits of Production in a Ratio of Four to One Compared with Older Style Pattern (Center and Left)





cast steel chaplets 6 in. high are used. The top core is made so that it rests on outside joint of mold. The sink heads are made in the core.

In some cases molds are made in the drag only, with no cope, cover cores are set and risers are rammed separately and placed on top in the proper location. This is mentioned not as an exception to practice in other foundries, but as a practice which led up to the

of production, but also mean easier machining or more satisfactory service or dependability.

One example is the making of brake wheels as used in solenoid brakes for elevator service. Considerable difficulty had been encountered in casting these brake wheels, so that built-up construction was resorted to. A cold-rolled steel hub was electrically welded to a plate web. Around this was welded a rim which was

rolled and had a welded joint. While expensive to make, these built-up wheels were satisfactory, if the weld in the rim did not open up in service. Stacking of molds was resorted to in which a series of wheels was cast in one mold. This method proved unsatisfactory.

The present practice is to drop forge the smaller wheels 7-in., 9-in., 11-in. and 12-in. These are made with long hubs, which are cut to suit several different lengths, some having a long hub on one side and a short one on the other, while other wheels of the same diameter may have two long hubs or some other combination of hub dimensions. Incidentally, it may be of interest to note that the company uses tallow to lubricate drop forge dies instead of oil, since the tallow has less tendency to check the die.

The larger brake wheels are made of cast steel, the molds being made to produce a solid hub through which the steel is poured. A brick is placed at the bottom of the hub on which the steel strikes when it is poured. Four gates lead from this brick 90 deg. apart to the rim, so that the metal will rise in the rim as ame time as in the hub. This practice prevents the steel from running over the core. Four risers are made on the rim with a small pad on the inside of the

rim under each head. A riser or sink head is placed on the hub, also. The size of the heads, of course, is determined by size and weight of the casting.

Another very interesting casting of smaller type in this foundry is a hollow armature core and shaft for elevator motors. Objections were raised to the use of keys between armature core drum and shaft on motors in this service. To overcome this objection a method was devised of casting the core and shaft integral, making the casting hollow for sake of lightness. The cored hole extends through the journal at the spider end to the beginning of the journal at the other end. All castings cast so far have proved satisfactory, allowing ¼ in. on the drum end and ¾ in. on the shaft portion for finish. The spider is pressed on the hollow shaft, and allows practically no chance to loosen. The spider carries rope reeving and brake drum. Laminations are placed between it and a flange bolted on the other end.

All the steel is made on basic bottoms, as double slag heats, and each heat is subjected to physical and chemical tests, and an accurate record kept. All of the more important castings are given serial numbers by which they can be tied down to the heat from which they were cast.

Upward Pressure of Cores and Copes

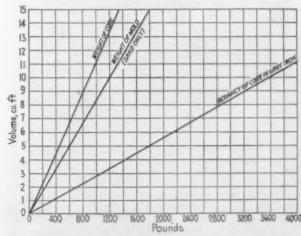
Buoyancy of Cores and Pressure Head of Metal—Upward Pressure on Copes—Weighting of Flasks

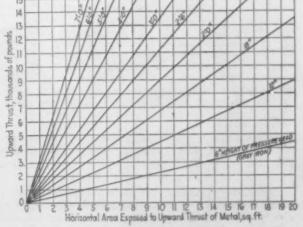
BY HERMAN COHEN*

IN a previous article, relative to the design of flasks, which appeared in THE IRON AGE of April 17, 1924, the matter of the upward thrust of cores as affecting the design of flasks was touched on. Limitations of

horizontal or otherwise) in the liquid, by the height of liquid above it nor by the area exposed to the liquid.

In the case of gray iron, which weighs approximately 450 lb. per cu. ft., a solid, one cubic foot in vol-





Notes on Charts: Gray iron figured at 450 lb. per cu. ft. For steel add 7 per cent. For brass and bronse add 20 per cent. Baked core sand figured at 90 lb. per cu. ft. Rammed molding sand figured at 120 lb. per cu. ft.

space at that time did not permit a more detailed discussion of the points involved.

Buoyancy of Cores

If any solid is wholly or partly submerged in a liquid there is a tendency for it to float or sink, due to the divergence in weight between it and the liquid. To state the law of hydrostatics which applies, the total upward pressure of a liquid against a floating or submerged body is the same as if the portion of the body below the surface were replaced by the liquid. That is to say, there is a tendency to float or rise, the total pressure of which is the same as the weight of the volume of liquid displaced by the solid.

This upward pressure, due to the divergence in weight between a liquid and a solid—the buoyancy—is constant for the same volume; that is to say, it is not affected by the shape of the solid, its position (vertical,

ume, wholly immersed, would have a total upward thrust of 450 lb. exerted against it. If the solid be made of baked core sand weighing approximately 90 lb. per cu. ft., then the net upward thrust would be approximately 360 lb. As stated, the buoyancy of a core is dependent, for any stated metal, only on the volume of metal displaced by the core, and this is not affected by the area exposed to the metal, the height of metal in the gates or risers, the shape of the core, its position in the mold, etc.

Pressure Head of Metal on Cores

In discussing the buoyancy of a core, it was stated that, by buoyancy, was understood the tendency to rise or float due to the volume of liquid displaced by the core. This condition will exist when a mold is wholly or partly full but, however, it is not the only condition that can affect the upward thrust of a core.

When metal is poured into a mold and the common

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practice of choking the gates is followed, there is a column of metal, liquid, in the gates. The intensity of pressure at the base of this column, according to the principles of hydrostatics, will depend on the density of the fluid and the height of the column. It should be noted that the intensity of pressure at the bottom of a column is the same, regardless of the shape of the gates or risers, nor has the amount of metal any influence if the height of the column or pressure head is the same. The total pressure on the base of a column, however, is the product of the intensity of pressure and the area of the base, but this total pressure has no bearing on the pressure transmitted.

The intensity of pressure is transmitted in all directions and, as the mold is filled, will gradually decrease as the height of the column above the level of the metal decreases.

If a core is placed horizontally in the mold, or has a horizontal projection, the metal rising in the mold will transmit its pressure to the core or its horizontal projection in the same way that water or any other liquid under pressure will act against a piston or plunger in a pump or other piece of hydraulic machinery and, if the core is not weighted or held down, it will rise and crush the mold.

The total pressure produced on the core due to the height of metal in the gates is the product of the intensity of pressure and the horizontal area (or projected horizontal area in the case of curved or irregular bodies) exposed to the pressure, as in the case of a piston or plunger.

The net upward thrust of a core due to this condition will be this total pressure, less the weight of the core.

For gray iron the approximate intensity of pressure in pounds per square inch is 0.26 per in. height of metal in the gates, which is the weight of a cubic inch of iron figured on the basis of 450 lb. per cu. ft.

Upward Pressure on Copes and Weighting of Flasks

The upward thrust of the cope of a mold is almost always due to the pressure head of the metal. This can be figured in the same way as the pressure head on the core, the upward thrust being the intensity of pressure multiplied by the area exposed to the pressure. The net upward thrust is obtained by subtracting the weight of sand in the cope and the weight of the flask.

In figuring the weights required to hold down a core or cope, the buoyancy of the core and the net upward thrusts due to the pressure head on both core and cope should be figured, and the extreme case provided for.

Heat Treatment of Gray Cast Iron

Relieving Stresses or Softening by Annealing—Effect of Quenching and Drawing—Other Special Treatments

BY J. W. BOLTON

EAT treatment to control or to change the properties of steel has been practised for many years. In many respects gray cast iron is closely related to steel. This similarity has undoubtedly led to attempts to harden, strengthen or soften cast iron by various heat treatments. Notwithstanding this, there seems to have been few successful applications of heat treatment to gray cast iron. During the last decade there has been great progress in scientific methods of steel heat treatment. There are comparatively few plants manufacturing heat-treated gray iron products.

The subject of heat treatment includes the operations of annealing, of hardening and tempering, and of carburizing. Study of the first two operations has been conducted in the author's laboratory. Case hardening, or carburizing, will not be considered in this paper.

Annealing to Relieve Stresses

Annealing of cast iron is understood either to relieve internal stresses or to make the casting more machinable.** When cast, many parts have considerable internal stresses. These stresses are due to variations in contraction due to different rates of cooling in various parts of the casting. When these stresses approach the ultimate strength of the material, slight external forces may cause rupture. For example, some manufacturers make gears with too thin arms. These arms sometimes crack. The author once saw a 15-ton fixture which cracked while lying in a machine shop. This

type of failure is generally due to design. Contraction of long, thin sections, rigidly held at either end by heavy sections, results in great tensile stresses and often in failure.

Such failures must not be confused with those due to rigid cores. These latter troubles are more commonly found in castings of round section. The author recalls a firm making castings about 4 ft. in diameter and 15 ft. long, of 1%-in. metal section. A collapsible core was used, but when the core barrel didn't collapse the casting did. There must be allowance for contraction.

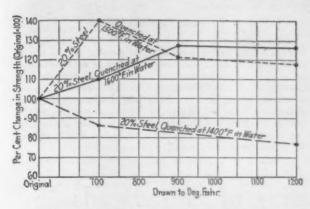
In many cases internal stresses do not cause failure of the casting, but cause warping. This is particularly true of machined castings. After the outer skin has been removed and the casting machined to size, warpage may occur and ruin the accuracy of the job. To avoid this many firms rough machine their castings, then allow them to lie exposed to the weather for several weeks, or even months. This ageing process allows the stresses to readjust themselves and when the final cuts are taken the casting will retain its accuracy. Heating slowly to 700-100 deg. Fahr. and cooling in the furnace after rough machining should accomplish the same result in a few hours. The Niles Tool Works has an annealing furnace about 12 ft. x 16 ft. x 8½ ft. high, inside dimensions, which is used for this purpose.

Annealing to Soften

Annealing to materially soften the castings is practical only where the strength requirements are not severe. One of the accompanying diagrams shows

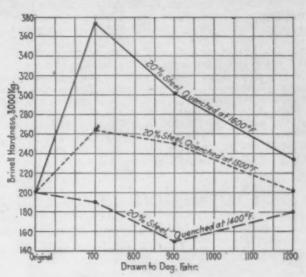
THE heat treatment of cast iron is one of the many metallurgical problems confronting iron foundrymen today. The author, who is metallurgist of the Niles Tool Works Co.. Hamilton, Ohio, has conducted a considerable amount of research in connection with this problem, and the present article is more or less introductory. It has been known for years that iron, cast so that it has a white fracture, can be annealed to give a malleable and fairly strong metal which, as malleable iron, is widely used. Until recent years little has been done to demonstrate the properties of true gray iron when annealed or otherwise heat treated.

^{**}Annealing of white iron to produce malleable is not considered in this article.



Drop in Strength and Other Changes During Heat Treatment of Gray Iron

Effect on Brinell Hardness (Right) of the Heat Treatment at Various Temperatures



that there is a considerable drop in strength at about 1100 deg. Fahr. The iron becomes very weak, indeed, when annealed above 1300 deg. Fahr. This drop in strength is accompanied by a radical change in struc-

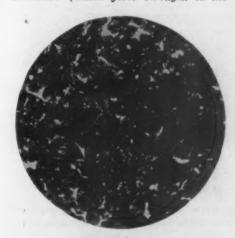
and partially chilled, high temperature annealing will produce much less loss in strength.

Quenching and Drawing

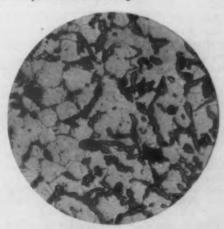
ture, as shown in the photomicrographs.

Hardening cast iron by quenching and drawing is
a process which is comparatively new to most foun-Hardening cast iron by quenching and drawing is

DRAWING, or mild annealing, relieves strains, but does not change the structure of the metal. Higher temperature annealing completely changes the structure and causes more internal strains to be set up. Pearlite structure (which gives strength to the metal) is destroyed by higher temperature annealing.



Structure the Same Before and After Drawing (Left). Normal pearlite structure, which is the same before and after drawing. (100 dia. Etched.)





Typical Pearlite Structure at 700 Dia. Magnification, Unchanged by Low Temperature

Structure Changed on Higher Temperature Annealing (Right Upper). (Right Upper).
Higher temperature
annealing destroys
pearlite. This sample was completely
annealed in 6 hr.
at 1600 deg. Fahr.
(100 dia. Etched.)



Annealed Structure. All pearlite de stroyed. Same sample as above. (700 dia. etched.) Changed by high temperature

drymen. Briefly, castings of small size can be hardened and the strength increased considerably by proper heat treatment. In case of castings of heavy section it is doubtful whether the process will ever prove successful. The reason for this is that cast iron dead anneals very rapidly. Due to the difference in temperature between the outer and inner parts of the casting, the outer portion would be completely annealed (i.e., completely graphitized) before the inner portion had reached a sufficient temperature to harden on quenching. The curves in the second chart show the results of some of the earlier experiments in this laboratory. Heattreated cast iron has a beautiful silky light gray fracture; it can be made file hard, and is not nearly so

brittle as regular white iron. It may be used to advantage in special parts.

Other Treatments

In its broadest sense heat treatment includes any process which modifies the normal cooling of the metal in the sand mold. There are a number of methods used to modify the cast structure. All foundrymen are familiar with the use of chills. The use of special molds, of metal or refractory materials, modifies the structure of iron considerably. For example, the manufacture of pearlitic iron involves a heat treatment of this type. Pulling the casting while hot also changes the properties of the metal.

Proportioning and Shaping of Sink Heads

Conical Heads and Their Advantages—Too Large Heads and the Cost of Steel Castings—Pouring Long Castings on End

BY JOHN HOWE HALL

PAR too little attention is being paid by many steel foundrymen to the losses which might be avoided by the use of proper sink heads on many steel castings, says the author of this article, who is chief metallurgist of the Taylor-Wharton Iron & Steel Co., High Bridge, N. J., and who is the author of a book on steel foundry practice. He offers some valuable suggestions on this subject. He shows how not only a saving of metal can be secured, but a lowering of the cost of steel, if the proportioning and shaping of risers is carefully studied. He also describes the advantages of the use of a comparatively new kind of riser which is cone shaped

AR too many foundrymen today seem to regard, as a purely minor question, the relation between the weight of a sink head and that of the casting it is designed to feed. They use sink heads a great deal heavier than is necessary for the proper feeding of their castings.

In talking to these men, one generally finds that they have only a very hazy idea of the difference between the cost of steel in the ladle and that of steel in good castings, and of the effect, upon the cost of steel in good castings, of small increases in the percentage of yield. When asked if the heads they are using are not unnecessarily large and heavy, they ask what difference it makes, as the steel is not lost, but saved for remelting as scrap. "We have to remelt our heads, anyway," they reply, "so what does it matter if we do remelt 10 per cent more heads than the other fellow. It cuts down the amount of scrap we have to melt just that much!"

Excessive Use of Steel in Heads

This point of view, of course, is fallacious, as the amount of raw material, be it scrap or pig iron, bought in a year is directly proportional to the output of castings in that year and is in no way affected by the weight of sink heads remelted each day.

Perhaps the simplest way to make the matter clear is to think of the purchased material used per day, less the loss in melting and conversion, as making up the weight of castings produced each day, and the heads and gates as simply going back and forth between the molds and the steel-making department, costing the foundrymen money each day for melting costs and conversion losses incurred in remelting. The smaller this weight of metal that has to be melted each day, not for sale as castings but simply as feeder metal, the less the melting and conversion costs in the total—and hence in pounds of castings produced.

In dollars and cents, steel in the ladle is worth the

initial cost of the raw material of which it is made, plus the cost of melting and conversion, and that portion of it which becomes castings is sold on that basis; while that portion which is used as sink heads, gates, etc., can be sold only as scrap, and therefore is worth about the same as the raw material of which it was made—a little more of the basic process is used, so that the foundry scrap is lower in phosphorus than the stock purchased, a little less if it has gained in phosphorus or sulphur content in the steel-making process, as is the case in Tropenas work.

Cost of Steel in Good Castings

To figure the cost of steel in good castings, with a given value of steel in the ladle and a given proportion

Value 1	eel in ladie low phos. scrap. neavy melting sci		21.00				
Good	Samon	Cost Steel in Castings					
Castings, Per Cent 45 50	Scrap Recovered, Per Cent 50 45	Scrap @ \$21.00 \$65.55 61.10	Scrap @ \$18.00 \$68.88 63.80				
55	40	57.45	59.63				
60 65 70	30	51.84 49.64	56.17 53.23 50.71				

between weight of steel in the ladle and weight of castings poured, is so simple a matter than one often wonders at the hazy ideas of foundrymen who pay so little attention to using the smallest possible heads that will properly feed their castings.

From a ton of metal in the ladle, worth \$40, let us assume that 0.50 tons of good castings are poured, 0.45 tons of scrap worth \$21 per ton is recovered, and 0.50 tons are lost as spillings. What is the cost of steel per ton of good castings produced? The an-

swer is, of course—cost of steel in good castings equals cost of steel in ladle, less value of scrap recovered, divided by weight of castings produced or in the case in question:

$$\frac{\$40.00 - 0.45 \times \$21.00}{0.50} = \$61.10$$

The less the value of the scrap in the above equation, the greater the difference between cost of steel in good castings and cost of steel in the ladle; and for a given value of scrap, the greater the yield of good castings, the smaller this difference as the table shows.

An examination of this table shows that, with scrap at \$21 per ton, to raise the yield of good castings from 50 to 55 per cent, decreases the cost of steel in good castings \$3.65 per ton, or nearly 2/10c. per lb. If the scrap is worth less, the saving is larger; and the saving for any given value of scrap is greater when the yield is raised from 45 to 50 per cent, for instance, than when it is raised from 65 to 70 per cent. As the foundries using unduly large heads are the ones obtaining the low yields, one can easily see that there should be plenty of incentive for the authorities in these shops to improve their practice, especially in these days when fractions of a cent may spell the difference between profit and loss, or between "landing" an order and losing it to a competitor.

Heads Too Large in Cross Section

Probably the most common manner in which metal is wasted in sink heads is the use of heads much larger in cross section than the piece on which they are set, connected to the casting by necks thinner than either the casting or the head. It has been so frequently pointed out as to be trite that these thin necks freeze so long before either casting or head that very little of the metal in the head ever finds its way into the casting it is intended to feed.

The excuse most commonly given for following this practice is that the heads are easily and cheaply broken off with a sledge; and so they are, but a head only slightly larger than the neck would be broken off as cheaply and would feed the casting as well without the ridiculous waste of good metal in the bulky heads. Moreover in these days when heads are so quickly and cheaply cut off with gas, it is short-sighted policy to design the heads so that they only partly feed the casting, and a large part of the metal in them is wasted, merely for the slight saving made by knocking off the heads.

It should be axiomatic that the neck should be of about the same thickness as the casting to which it is attached, and as short as possible so that it is kept fluid by the metal above and below it; and that the head should be only enough wider than the neck to make sure that it stays fluid at the center as long as there is any possibility of its feeding metal through the neck to the casting below.

Advantage of Conical Heads

One of the most important improvements that has been made in the design of heads in recent years is the practice of tapering them strongly from the bottom up, so that they have a very small area at the top where they are exposed to the air. This design has the advantage of bringing a large proportion of the metal in the heads close to the casting where it has a better chance to keep the necks hot and fluid than the same weight of metal in a straight-sided head. Moreover, this metal is covered deeply with sand, so that it cools at the slowest possible rate, and the area exposed to the air is so small compared to that exposed in the case of the straight-sided head, that the extent to which the metal is air-cooled and frozen at the top is greatly reduced. As a result, the conical head drains out far better and a larger proportion of its contents is utilized in feeding the casting than in the case of the straight-sided head, so that a given size of head feeds any particular casting more effectively. In many cases a smaller head may be used for a casting of a given size, with less loss of metal in the form of scrap.

Whatever the shape of a head, whether it be of circular or square cross section or, for instance, a continuation of the portion of the casting below it such as a ring shaped head on the hub of a wheel, the advantage of tapering the head is sufficient to recommend it in almost every case. One has only to split a few of these heads open from top to bottom with a gas torch, and compare them with similar sections of straight-sided heads, to be convinced that they feed a much greater proportion of their contents than do the straight-sided heads.

Waste Caused by Promiscuous Heads

A waste of metal that is still found in a great many foundries is the promiscuous use of heads, 3 or 4 in. in diameter, on castings of practically uniform and light section where heads are not really required as feeders, but serve chiefly as flow offs or "pops" to carry out dirt and give notice when the mold is full. In many such cases a pop not over an inch thick would serve the purpose equally well and could be molded more easily, yet the big head is stuck on, apparently from mere habit.

Again, many a casting is molded and poured on its side, bristling with big heads, when it might far better be poured on end, with one or two heads, or a single head forming a continuation of the casting, each portion of the piece feeding that immediately below, and the head feeding the very top. Often the only apparent reason for not pouring the casting on end is that flasks do not happen to be at hand suited to the job, and no one takes the trouble to rig up enough flasks to take care of the order, even though the cost of fixing up the flasks is insignificant compared to the possible saving in metal and improvement in soundness of castings.

Long Castings Poured on End

A possible saving not often taken advantage of follows logically from consideration of the desirability of pouring long castings on end. This is the method of doing away with heads altogether on about four out of five identical castings of simple shape, by molding them as one long casting with a sink head on the top, pouring the whole affair on end, and then cutting it up into sections like slices off a bologna. Or, to vary the comparison, "building by the mile and cutting them off to order," as was contemptuously said of the wooden coasting schooners built upon the Atlantic seaboard.

Plain cylinders, gear blanks or gears with square ends, rolls of larger or smaller size, and a host of similar castings are often ordered in lots of 5 or 10, which can easily be made in this way. The job of cutting into sections is often far less expensive than the metal wasted as heads in pouring the castings in individual molds, yet in how many jobbing foundries is advantage taken of this possible saving? When the attention of one jobbing foundryman was called to the possibility of making this saving, he said "You see, I've worked in jobbing foundries all my life and I don't seem to think of production methods like that!"

The Ultimate Remedy

The ultimate fate of the foundry where the boss "doesn't seem to think" of these little things is, or should be, the sheriff's sale. One manager said to his men, when certain castings were coming defective and the cause and remedy were being sought: "Let's start on the assumption that everything we are doing is wrong, from steel making to marking the castings for shipment, and prove each step right before we O.K. it." Perhaps the best policy for a foundry manager would be just that; to start off once a month or once a week on the assumption that every job was being handled wrong, should be molded and headed some other way, and see in how many cases the assumption was justified. The author would hazard a guess that the proportion of jobs that could be executed better "some other way" would be beyond all expectations.

High-Manganese Steel for Locomotives

Its Properties When Incorporated in Cast Steel Engine Frames and Crossheads—Composition and Heat Treatment

BY EDWIN F. CONE

ARGER locomotives mean heavier loads on bridges and rails. The gradual tendency to increase the size in order to secure greater tractive power has finally resulted in the incorporation of more steel in the use of heavier parts or sections. The modern locomotive, whether passenger or freight, is decidedly larger and heavier than that of but a few years ago.

The problem recently has been to reduce certain sections, without loss of strength, by the use of alloy steels. With some railroads this is established practice; others are considering the step. The use of alloys applies to both steel castings and forgings.

Some years ago the largest producer of steel castings perfected a process for making a steel wheel in a revolving mold by which the rim of the wheel contains around 1.60 per cent to 1.80 per cent manganese, with the remainder or central portion gradually falling off in manganese content until at the center it was normal, or around 0.60 to 0.65 per cent. This product is known as the Davis wheel and is still made on a large scale. It is named from its inventor, J. C. Davis, fourth vice-president American Steel Foundries, Chicago.

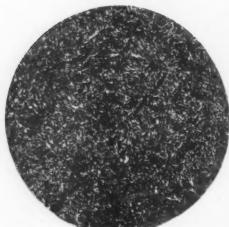
During the war steel similar to that in this wheel

was developed and gained wide use. It was an ordinary mild carbon steel for castings with the manganese raised to about 1.25 per cent. It was incorporated into a cast steel chain for anchors, which after proper heat treatment was made on a large scale by the National Malleable Castings Co. The perfection of this process for making cast steel chain—a unique and interesting foundry development—made it possible to supply our ships with chain for anchors, since chain made of wrought iron was not obtainable in sufficient quantity.

There are other applications industrially of this high-manganese steel. One large railroad is making a trial of rails of about this composition, and high-manganese forgings are also being introduced and studied.

Quite recently the incorporation of a high-manganese steel in locomotive engine frames has been advocated by the same company which makes the Davis wheel and it is understood three railroads are trying frames of such materials in some of their new engines. The fact that this steel, after proper heat treatment, has a high tensile strength coupled with a high elastic limit and satisfactory ductility is cited as indicating its suitability for castings or forgings where lighter sections without sacrifice of strength can be employed. As





PHOTOMICRO-GRAPHS of "Hylastic" Cast Steel, All at 100

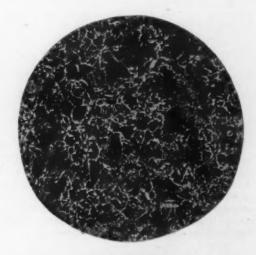
No. 1 (upper left) represents the structure as annealed and cooled

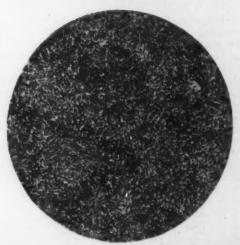
slowly.

No. 2 (upper right) is also annealed and cooled slowly.

Nos. 3 and 4, (lower left and right) represent the specially heat-treated steel.

Each photomicrograph represents test pieces Nos. 1 to 4, in the first table of physical tests.





much as 15 years ago another alloy steel was introduced as suitable for locomotive engine frames, and large quantities are still being so used, though in those earlier days no change to lighter sections was found necessary.

The new high-manganese steel, so called because it contains more manganese than ordinary steel and much less than regular manganese steel, is offered under the name of "hylastic." It contains about 0.35 per cent carbon with the manganese between 1.60 and 1.80 per cent. The elastic ratio runs over 50 per cent. The chemical analyses of some heats of this steel, recently produced, are reported as follows:

Sp	ecimen	Heat	Car- bon, Per Cent	Manga- nese, Per Cent	Sili- con, Per Cent	Phos- phorus, Per Cent	Sulphur Per Cent
No.	1	54,889	0.377	1.64	0.30	0.021	0.028
No.	2	54,889	0.377	1.64	0.30	0.021	0.028
No.	3	56,755	0.334	1.70	0.30	0.016	0.030
No.	4	57,308	0.374	1.60	0.31	0.015	0.028

This is basic open-hearth steel. It is closely analagous to the regular high carbon steel which the Government stipulates for certain castings with the exception of the high-manganese. This high carbon steel was also specified for locomotive frames about 15 years

"Hylastic" steel, after being poured as castings, is subjected to a special heat treatment, the details of which are not obtainable. However, the results of 19 heats of steel for Davis wheels are as follows:

Tensile strength,									
Elastic ratio, lb. 1	per sq.	in	 0				0		
Elongation in 2 is	n., per	cent	 0		0	0		0	
Reduction in area	, per c	ent.	 8	n =	10	10			53.9

The physical properties of two heats recently made for castings are given below:

Carbon, per cent Manganese, per cent Silica, per cent Phosphorus, per cent Sulphur, per cent	Heat No. 60,233 0.34 1.69 0.31 0.021 0.028	Heat No. 60,260 9.35 1.79 0.28 0.022 6.028		
Tensile strength, lb. per sq. in. Yield point by dividers Elong. in.2 in., per cent Reduction of area, per cent	99,850 54,000 26.0 49.7	101,300 54,000 26.0 54.1		
Bend, 1/2 by 1 in.; 7 in.				

176 deg.

These results reveal a high strength with an elastic ratio of over 50 per cent, combined with satisfactory ductility. They show one effect of the increased manganese content, reinforced of course by heat treatment. The physical properties of this steel show an increase of about 20 per cent over the same steel without the high-manganese but with ordinary annealing. The appearance of this steel under the microscope is shown by the accompanying photomicrographs. appearance after merely annealing, according to the heat treatment of most castings, is shown, as well as the contrast in structure after this steel has been specially heat treated, which is the condition recommended for use in locomotive frames.

around a 4-in. radius.

Locomotive crossheads are being made from this steel, though in such castings the manganese is kept close to 1.40 to 1.55 per cent. The steel is being advocated also for forged reciprocating parts of locomotives. One advantage claimed for it is its inexpensiveness as well as its parity in most respects with the more familiar alloy steels.

MANY PAPERS SCHEDULED

Program for Milwaukee Meeting of American Foundrymen's Association

A REVISED program for the technical sessions of the annual convention of American foundrymen in Milwaukee, Oct. 13 to 16 follows:

Monday, p. m., Oct. 13. Chairman, G. H. Clamer; associate chairman G. K. Elliott.—Session No. 1 (Joint session of the A. F. A. with Institute of Metals, I. M. E.)

"Making Copper Castings from Cupola Melted Metals," by T. F. Jennings, Garfield, Utah. "Modern Bell Founding," by Wesley Lambert and

G. Hall, London, England, Annual Institute of British Foundrymen exchange paper

"Founding of Brass in Mexico," by H. H. Miller,

Torreon, Coahuila, Mexico.

"Art Bronze Work," by J. F. Arnold, Mt. Vernon, N. V.

'Recuperation in Connection with Brass Melting," by H. D. Savage, Combustion Engineering Corporation, New York.

Report of Committee on Non-Ferrous Metals. "The Copper Refining Industry," I Film by the Balti-

Monday, p. m., Oct. 13. Chairman, A. H. Jameson; ass ciate chairman, S. W. Utley.—Session No. 2 (Steel Foundry Topics). "Broadening the Field for Steel Castings through the

Use of Alloys and Heat Treatment," by F. Grotta, Holt

Mfg. Co., Peoria, Ill.
Report of Committee on Steel Castings.

Report of Committee on Refractories.

"The Microscope as a Controlling Instrument in Annealing Steel Castings," by J. F. Harper, and H. J. Stein, Allis-Chalmers Co., Milwaukee.

"The Heat Treatment of Steel Valve Castings in the Electric Furnace," by V. T. Malcolm and A. Sproat, Chapman Valve Co., Indian Orchard, Mass

Tuesday, a. m., Oct. 14. Chairman, W. M. Corse; as ciate chairman, L. W. Olson. — Session No. (Aluminum and Aluminum Alloys, Joint Session of the A. F. A. with the Institute of Metals Division, A. I. M. E.)

Production of Aluminum Alloy Pistons in Permanent Molds," by R. J. Anderson, Boston, and M. E. Boyd, Clinton, Mich.

"Aluminum-Silicon Alloys," by D. Basch, General Electric Co., and M. F. Sayre, Union College, Schenectady, N. Y.

"Aluminum Alloy Castings from Sheet Scrap," by H. C. Knerr, Philadelphia.

"Salvage of Aluminum Alloy Castings by Welding and Soldering," by R. J. Anderson, Boston, and M. E. Boyd, Clinton, Mich.

"Alpax, a New Development in Aluminum Alloys," by Dr. L. Guillet, Paris, France; translated by R. J. Anderson, Boston.

Tuesday, a. m., Oct. 14. Chairman, John Howe Hall; ciate chairman, W. J. Nugent.—Session No. 4 (Steel Foundry).

Report of A. F. A. Representative on Joint Investigation of Phosphorus and Sulphur in Steel.

"Organization and Practice in Steel Foundry Finishing Room," by C. W. Heywood, Burnside Steel Co., Chicago.

"Notes on the Overall Performance of Acid Electric Furnaces," by T. S. Quinn, Lebanon Steel Foundry, Lebanon, Pa.

"X-rays in the Foundry," by Dr. Ancel St. John, New

Report of Committee on Heat Treatment of Ferrous

Tuesday, a. m., Oct. 14. Chairman, H. S. Falk; associate chairman, William Watson.—Session No. 5 (Apprentice Training).

First Division-Employers and Executives.

"The Employer's Expectation of Apprenticeship," by R. J. Doty, Sivyer Steel Casting Co., Milwaukee. "The Milwaukee District Program," by H. S. Falk,

Falk Corporation, Milwaukee.

"The Milwaukee Continuation School," by M. S. Cooley, director, Milwaukee Continuation School. Second Division-District Apprentice Convocation.

"Apprenticeship from Apprentice Viewpoint," by J. Edwards.

"Why I Talk Apprenticeship," by C. Freund.

This program will be supplemented by an actual working demonstration of the Falk Apprenticeship Department which for the convention week will be located in a booth in the convention hall. Inspection trips to plants operating apprentice departments will also be arranged.

Tuesday, p. m., Oct. 14. Chairman, W. M. Saunders; asso-

ciate chairman, R. A. Bull.-Session No. 6 (Sand Research).

Report of Chairman of Joint Committee on Molding Sand Research.

Report of Chairman of Sub-Committee on Test of Joint Committee on Molding Sand Research,

"Development and Comparison of Permeability Testing Apparatus," by T. C. Adams, Cornell University, Ithaca, N. Y.

"Relation of Water to Bond and Permeability," by C. R. Nevin, Cornell University, Ithaca, N. Y. "Physical Properties of Foundry Sand," by C. A. Hansen, General Electric Co., Schenectady, N. Y.
"Illinois Sand Resources," by M. M. Leighton, direc-

tor, Illinois State Geological Survey.
"Commercial Application of Molding Sand Testing,"

by H. W. Dietert, United States Radiator Corporation,

"A Study of the Effect of Heat on the Clay Content of Molding Sands, as Shown by the Dye Absorption Test," by R. F. Harrington, W. L. MacComb and M. A. Hosmer, Hunt-Spiller Mfg. Corporation, Boston.

Tuesday, p. m., Oct. 14. Chairman, G. K. Elliott.-No. 7 (Special Session of the Institute of Metals Division of the A. I. M. E.)

"Casting and Heat Treatment of Some Aluminum-Copper-Magnesium Alloys," by Samuel Daniels, A. J. Lyon and J. B. Johnson, Engineering Division Air Ser-U. S. A., Dayton, Ohio.

"Experiments on the Heat Treatment of Alpha-Beta Brass," by O. W. Ellis and D. A. Schemnitz, Toronto,

Ontario, Canada. "Coating Formed on Corroded Metals and Alloys," by George M. Enos, Cincinnati, and Robert J. Anderson,

"Notes on Hardness of Heat-treated Aluminum Bronze," by George F. Comstock, Titanium Alloy Mfg. Co., Niagara Falls, N. Y.

Wednesday, a. m., Oct. 15. Chairman, W. M. Saunders; associate chairman, R. J. Doty.—Session No. 8 (Sand Research).

Report of Sub Committee on Geological Surveys Report of Sub-Committee on Conservation and Reclamation.

'Notes on the Grading of Sands," by C. R. Nevin,

Cornell University, Ithaca, N. Y.
"An Exhaustive Study of Various Molding Sand Mixtures, together with the Physical Properties of the Molds and Castings Produced," by Messrs. Harrington, Wright and Hosmer, Hunt-Spiller Mfg. Corporation,

"The Effect of Moisture, Silt and Clay Content on Various Molding Sand Mixtures," by Messrs. Harrington, Wright and Hosmer, Hunt-Spiller Mfg. Corporation,

"Molding Sand Reclamation and Control Experiments," by F. L. Wolf and A. A. Grubb, Ohio Brass Co., Mansfield, Ohio.

Wednesday, a. m., Oct. 15. Chairman, L. L. Anthes; associate chairman, J. K. Elliott. Session No. 9 (Electric Furnaces).

"Electric Furnace Gray Iron," by E. L. Wilson, F. J. Ryan Co., Philadelphia, Pa. "The Electric Furnace in the Pipe Foundry," by J. T. Mackenzie, American Cast Iron Pipe Co., Birmingham,

Report of Committee on Corrosion of Ferrous Metals.

Report of Committee on Coke.

Wednesday, p. m., Oct. 15. Chairman, G. H. Clamer; associate chairman, L. W. Olson. Session No. 10 (Business Session).

President's Address. Report of Officers.

Presentation of Major Awards.

"A World Outlook for American Foundrymen," by H. Cole Estep, Cleveland, Ohio.

Wednesday, p. m., Oct. 15. Chairman, C. B. Connelley, (To follow Session No. 9). Session No. 11 (Industrial Relations).

"Cost Finding in a Foundry," by W. J. Corbett, Electric Steel Founders' Research Group, Chicago.

"Departmental Costs in the Foundry," by H. B. May, W. K. Henderson Iron Works & Supply Co., Shreve-

Report of Committee on Costs.

Report of Joint Committee on Pattern Standardization. Thursday, a. m., Oct. 16. Chairman, R. A. Nourse; asso-sociate chairman, C. R. Messinger.—Session No. 12 (Malleable Cast Iron).

Report of Committee on Malleable Cast Iron.

"Oxidation Losses During Air Furnace Melting of White Cast Iron," by H. A. Schwartz, National Mal-leable & Steel Casting Co., Cleveland.

"Broadening an Industry's Horizon," by C. L. Eshleman, American Malleable Castings Association, Cleveland.

"The Mechanism for Graphitization of White Cast Iron and its Application to the Malleabilizing Process," by A. Hayes, W. J. Diederichs, and H. E. Flanders,

Iowa State College, Ames, Iowa.
Thursday, p. m., Oct. 16. Chairman, A. B. Root; associate chairman, H. B. Swan.—Session No. 13 (Gray Iron).

"Melting Steel in a Cupola," by J. Grennan, University of Michigan, Ann Arbor, Mich. Report of Committee on Cast Iron.

"Notes on Composition and Structure of A. S. T. M. Bar," by J. W. Bolton, Niles Tool Works, Hamilton, Ohio.

"An Investigation of Chill Iron," by E. J. Lowry, Hickman-Williams Co., Chicago.
"Characteristics that Chemical Analysis Fails to Disclose in Pig Iron and Castings," by W. E. Jominy, University of Michigan, Ann Arbor, Mich.

"Testing Iron to Control the Properties of Castings," by G. W. Gilderman, Dodge Brothers Mfg. Co., Misha-

Working Time in the Iron and Steel Industry

In the September number of the Monthly Labor Review, published by the Bureau of Labor Statistics, Washington, appears an article on working time in the iron and steel industry in 1924, with tables showing the number of employees working various stated numbers of hours per week. This includes a total of some 16,000 men, of whom two are listed as working 98 hr. per week, and altogether 844 worked 84 hr. or more. This represents more than 5 per cent of the number under study. Of the total number listed only one man had a week of less than 48 hr., and only 246, or less than 2 per cent, had weeks of less than 53 hr.

These figures, in view of the general elimination of the 12-hr. day, may come as something of a surprise until it is recalled that many of the smaller concerns have failed to put in the 8-hr. day.

Brass Manufacturers Meet

The National Association of Brass Manufacturers held a successful meeting in the Hotel Cleveland, Cleveland, on Sept. 16, 17 and 18. Among the many topics discussed was that of the discoloration of nickel plating, wherein some tests and investigation developed lack of care rather than inferior workmanship. It was pointed out that constant cleaning with soap and water will keep all plating goods, that are rightly plated, in proper condition, regardless of atmospheric conditions. Another thing, particularly in plating work, around kitchens and pantries is gases arising from foods and cooking. This can be overcome in the above method, but no gritty substance nor anything of an emery nature should at any time be used in cleaning plating. Kerosene, ammonia or gasoline can be used with good

Various standards pertaining to openings of lava-tories, bath tubs and other fixtures, and brass goods pertaining to water work matters, were adopted. metal mixture was standardized, both as to ingredients and physical properties, for brass goods used in connection with underground service, as follows:

> Copper, 85 per cent. Tin, 5 per cent. Lead, 4 per cent.

Zinc, 7 per cent. The physical test should be not less than 15,000 lb. per sq. in., and the tensile strength not less than 30,000 lb. The hydraulic test should be at 200 lb. 30,000 lb. The hydraulic test should be at 200 lb. water and 80 lb. air pressure. All curb stops with check are to close clockwise

A poll of the meeting showed a decided improvement in business conditions for the past ten days or two weeks. After the meeting adjournment was had to meet next on Dec. 9, 10 and 11 in New York.

Foundry Week in Milwaukee

Annual Convention and Exhibition of American Foundrymen, Oct. 11 to 17, Offer Attractive Papers and Displays

C IX years ago the American Foundrymen's Association met in Milwaukee. This year a larger convention and exhibition will again assemble in The technical sessions are scheduled for Oct. 13 to 16, with plant visitation day Oct. 17. As in Cleveland in April, 1923, the exhibition will be open one day earlier, Saturday, Oct. 11. An unusually profitable program of papers has been prepared and the prospects are that this year's affair will eclipse all others previously held by this organization.

Several special articles dealing with foundry subjects are published in this issue of THE IRON AGE. A complete report of the convention will appear in the issue of Oct. 23.

The Exhibitors and the Variety of Products Displayed

- A

 ADAMS Co., Dubuque, Iowa. Portable and stationary joit air squeezers; portable, single rod hand squeezers; double rod portable hand squeezers; pneumatic sand riddles, cherry snap flasks, steel jackets, steel bands, tubular steel sprue cutters, pneumatic rappers and vibrators. In attendance: A. J. Goss, Lester Demkier and John R. Moures. John B. Meyer.
- AIR REDUCTION SALES Co., New York. Airco oxygen, Airco acetylene and Airco-Davis-Bournonville oxyacetylene welding and cutting apparatus and supplies. tendance: L. W. Hughes, advertising department, New York; Fred Maeurer, industrial engineering department, Chicago; S. Shaykin, sales representative; Charles Williams, demonstrator, and W. P. Roberts, district manager, all of Chicago; E. L. Fiddyment, sales representative, Milwaukee.
- AJAX METAL Co., Philadelphia. Bronze, brass and other nonferrous alloys in ingots together with castings made
 from Ajax ingots; also samples of white metals; also
 an Ajax-Wyatt electric furnace for brass melting. In
 attendance: G. H. Clamer, president; F. M. Willeson,
 manager, Boston; Zeno D. Barns, manager, Cleveland;
 John G. Miller, manager, Chicago; Henry Gieseke, electric furnace representative, and Robert N. Blakeslee,
 electric furnace representative. electric furnace representative.
- ALBANY SAND & SUPPLY Co., Albany, N. Y. Samples of different grades of Albany molding sand. In attendance: L. Murray and Thomas F. Stokes.
- ALLOYS & PRODUCTS, INC., New York. Deoxidisers, densifyers, degasifyers, desulphurisers, hardeners, rich alloys, fluidizers; also alloys made to special compositions. In attendance: Henry Hecht, president and general manager; J. A. Dunn, assistant sales manager; Gilbert T. Mason, J. A. Fletcher.
- AMERICAN FOUNDRY EQUIPMENT Co., New York. Sand cutters, sand blast equipment, dust arresters, molding ma-

- chines, snap flasks, steel adjustable jackets, pattern mounting compound, hammer core machine and flask bars. In attendance: Verne E. Minich, president; Robert H. Kelley, secretary; Elmer A. Rich, vice-president; H. H. Haley, second vice-president; James Rigby, Jr., sales manager; J. D. Alexander, S. H. Baird, Charles L. Benham, C. G. Smith, E. J. Turnbuil, J. E. Sweet, G. H. Walsh, salesmen; David Logan, Charles Rose and R. C. Coburn, service men; R. H. Moore, engineer; A. H. Freeman, installer, and Mr. Schulte.
- AMERICAN VENT WAX Co., Lockport, N. Y. Vent wax, also various cores in which the company's vent wax has been used. In attendance: Nelson L. Nankey, president.
- AMES SHOVEL & TOOL Co., Boston. Molders' shovels includ-ing standard wood D handles, standard malleable D handles and special Ames split D handles; also and shovels of various types and special exhibit of O. Ames shovels manufactured prior to 1812. In attendance: A. C. Howell, president, and S. D. Burrell, special representative.
- ARCADE Mrg. Co., Freeport, Ill. An exhibit of Arcade and blast barrel machines, 6-in. jolter with center strip, No. 1-34 modern, No. 110 jolt modern, 8-in. air squeezer, No. 91 jolt squeezer, post jolt squeezer, 3-in. core jolter and Brillion pouring device. In attendance: L. L. Munn, vice-president and general manager; B. C. True-blood, treasurer; Henry Tscherning, chief engineer; Mentor Wheat, sales engineer; Vance S. Firestone, assistant chief engineer; August Christen, G. D. Wolf-ley, R. E. Turnbull, Herman Kasten and J. A. Morgan,
- ARMSTRONG-BLUM Mrg. Co., Chicago. Marvel metal band saw, automatic high speed saw, portable hack saw ma-chines; punching, shearing and bending machine. In attendance: Harry J. Blum, secretary.
- ASBURY GRAPHITE MILLS, Asbury, N. J. Graphite and plumbago for all purposes including foundry facing, stove



The Exhibition Will be Displayed in the Commodious Auditorium

- polish, paint, electrical and lubricating lines; also crude Ceylon and Madagascar graphite for making crucibles. In attendance: H. M. Riddle, Jr., treasurer and general manager; Jonathan Bartley, vice-president; Walter Field, New York office.
- AUSTIN Co., Cleveland. A display of complete foundry service, including photographs and construction drawings of both equipment and buildings; also a foundry built on a miniature scale completely equipped with miniature sand blast, charging machine, cupola, tumblers, etc., the machines being the product of the Whiting Corporation, W. W. Sly Mfg. Co. and the American Equipment Co. In attendance: O. D. Conover, foundry specialist and assistant chief engineer; G. A. Bryant, Jr., vice-president and sales manager; H. E. Stitt, chief engineer; A. S. Low, Chicago district manager; L. A. Campbell, sales engineer; A. H. Meyer, advertising manager, and S. F. Chard, Cleveland district sales manager.

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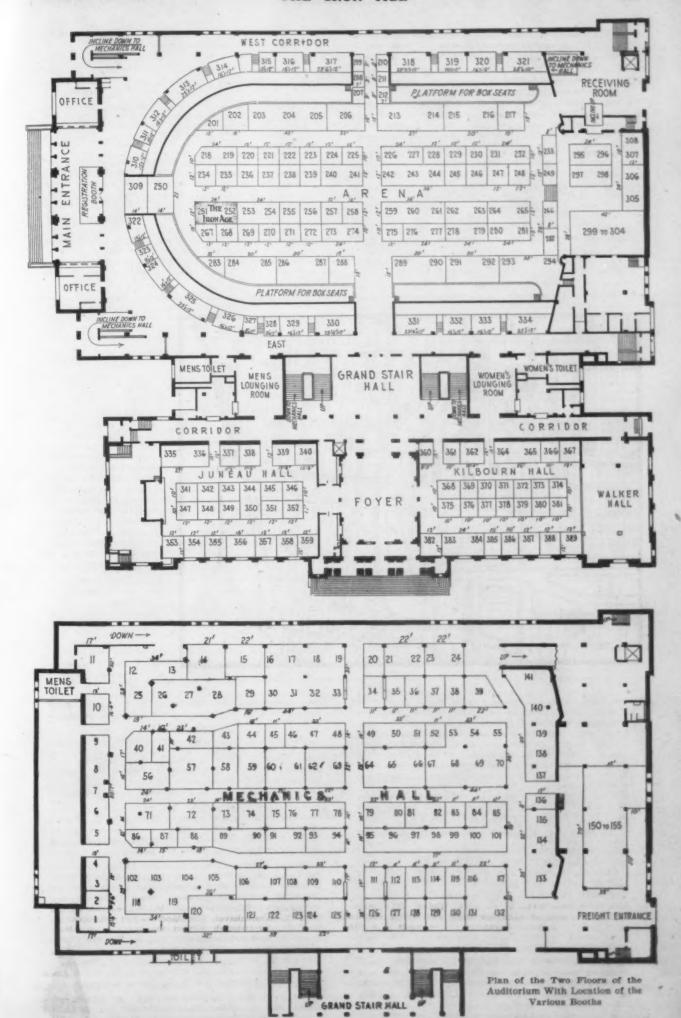
- BACHARACH INDUSTRIAL INSTRUMENT Co., Pittsburgh. Bacharach blast meter and P V blast recorder, used for maintaining the proper cupola and air furnace blast; also optical pyrometer for molten metal temperatures, and the new electric CO₂ meter for maintaining predetermined furnace conditions and improving furnace combustion. In attendance; Edward H. Stehman and L. J. Speidel.
- Baker R & L Co., Cleveland. Baker elevating truck, a Baker locomotive crane and a Baker charging truck for pot handling, the elevating truck being the one which has the widest use in the foundry, since it will carry core racks, molding sand. coke, pig iron, castings, sprues and gates. In attendance: M. A. Watterson, general sales manager; D. L. Darnell, assistant general sales manager; H. B. Greig, field engineer; W. F. Hebard and T. W. Barnes, Chicago office; Charles M. Johnson, Charles F. Zimmerman and Emil C. Held, Milwaukee; A. J. Gates, Cleveland, and B. C. Hooper, St. Paul.
- Barrett-Cravens Co., Chicago. Barrett lift-truck for handling work in the foundry, a feature claimed for it being that it handles green cores without breakage. In attendance: E. J. Heimer, secretary.
- C. O. Bartlett & Snow Co., Cleveland. Sand-handling equipment and mechanical-carrying equipment for use in foundries. In attendance: H. L. McKinnon, H. C. Orr, S. Gertz.
- BEARDSLEY & PIPER Co., Chicago. Tractor type Sandslinger as well as moving pictures of the various types of Sandslingers making different classes of work. In attendance: E. O. Beardsley, president; W. F. Piper, secretary; George Furman, sales manager; H. G. Schlichter, E. L. Mitchell and E. O'Connor, sales engineers; Harold Lind and P. Stefan, demonstrators, and W. E. Naylor, chief engineer.
- BERKSHIRE MFG. Co., Cleveland. Combination jolt squeeze and pattern draw molding machines, air squeeze pattern draw molding machines, vibrators, knee valves, etc. In attendance: G. L. Cannon, secretary, and George A. Scott, representative.
- CHARLES H. BESLY & Co., Chicago. New line of ball-bearing Besly grinders; a 42-in. vertical-spindle, direct-connected, motor-driven wet Besly disk grinder; Besly Titan abrasive disk with spiral face, and electric heater for use with Redisc cement in setting up abrasive disks. In attendance: R. W. Young, C. A. Knill, E. P. Welles, E. L. Beisel, L. E. Jacobs, C. H. Munch.
- BETHLEHEM STEEL Co., Bethlehem, Pa. An exhibit of Mayari pig iron, together with samples of cylinder castings and related work which has been done by some of the leading companies using Mayari iron in their mixtures. In attendance: H. B. Kreulen, F. E. Fisher, Robert MacDonald, D. A. Barkley, G. A. Richardson.
- BIRKENSTEIN & Sons, Inc., Chicago. Wizard ingot metals such as die cast ingots, copper, zinc and aluminum. In attendance: George Birkenstein, Harry Birkenstein, Louis Caviale, Eli Brown, Charles Raphael, F. F. Heymann.
- BLACK DIAMOND SAW & MACHINE WORKS, INC., Natick, Mass. Combined band saw filing and setting machine, circular saw filing machine, brazing outfit and band saw guides. In attendance: Walter B. Ambler, president; H. Bromley Ambler, salesman.
- BLYSTONE MFG. Co., Cambridge Springs, Pa. Blystone B No. 5 mixer, 30 cu. ft.; also core sand and foundry facing sand equipment. In attendance: L. G. Conroe, general manager, and C. E. McKinney.
- ALFRED Box & Co., Inc., Philadelphia. A 1000-lb. capacity Load Lifter electric hoist and one of the company's

- type L, form A, electric hoists, combined with motor driven trolley, floor controlled, equipped with special foundry control. These hoists are mounted on monorail I beam track and operated under power. In attendance: H. L. Bailey, Myles M. Jones and G. A. Mitchell, secretary and sales manager.
- BRIDGEPORT SAFETY EMERY WHEEL Co., Bridgeport, Conn. A No. 7 A.C. floor grinder, a No. 174 radial swing frame grinder, together with sectional wheel chuck and sectional grinding wheel. The No. 174 radial swing frame grinder is a new design, giving, it is claimed, a free range of movement to the wheel in practically every direction and eliminating all belts and overhead arms. In attendance: E. R. Hyde, president; D. T. Homan, vice-president; I. L. Burritt.
- BUCKEYE PRODUCTS Co., Cincinnati. Foundry core compounds, core oil, parting, refractory cements and miscellaneous foundry specialties. In attendance: C. J. Goehringer, E. O. Stamm, C. P. Stamm, C. S. Weigert, R. B. Ferguson and F. R. Edmunds.
- Burdett Mfg. Co., Chicago. Burco safety regulator controlling two gases, oxygen and acetylene, producing equal pressure automatically; Burco Sta-Set oxygen regulators for both welding and cutting; combination welding and cutting torch; Burco oxygen tank connection. In attendance: W. J. White, John G. Glaum, C. P. Clampitt, W. R. Noxon.

C

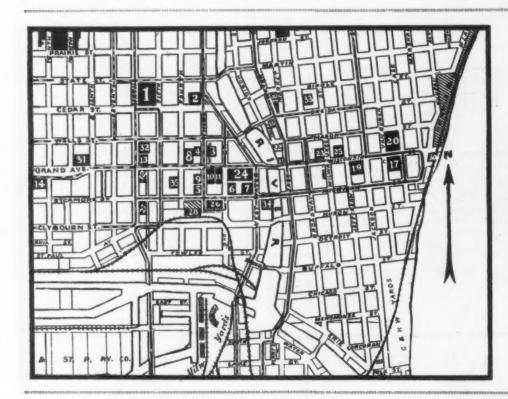
- CARBORUNDUM Co., Niagara Falls, N. Y. A complete line of Carborundum and Aloxite grinding wheels, together with samples of various materials ground by these wheels, such as steel, malleable and gray iron castings, railroad and automobile castings, chilled iron parts, crane wheels, draw bars, rolls, automobile crank cases, cast iron pistons, sanitary ware, etc.; also a new Carborundum Redmanol cutoff wheel, demonstrating the ability of this wheel for cutting off tool steel, tubing, foundry cores, etc., and a complete line of Carborundum refractory materials including Carbofrax brick for boiler settings, Carbofrax hearths for heat treating furnaces and Firefrax and Carbofrax cements for patching and setting up brick work and lining crucibles, etc In attendance: O. C. Dobson, district sales manager, Pittsburgh; Leonard Pitt, sales representative, Cincinnati; H. E. Korwin, sales representative, Chicago; Anthony Dobson, district sales manager, Detroit; F. C. Guest, sales department; George W. Chormann, sales engineering department, and Robert Rannie, sales engineering department, Niagara Falls.
- CARPENTER BROS., Milwaukee. Foundry sands. In attendance: M. J. Carpenter, president, and E. N. Carpenter.
- Frank D. Chase, Inc., Chicago. Photographs of recently constructed foundry buildings and layouts, together with plans and drawings. In attendance: Frank D. Chase, president; M. L. Pereira, vice-president; Fred Graf, engineer of foundries.
- CARTER BLOXONEND FLOORING Co., Kansas City, Mo. A large panel made up from 8-ft. lengths of Bloxonend flooring, illustrating the method of laying Bloxonend over old or new concrete or wood floors. In attendance:

 A. E. Giese, manager; John Thomasma, sales engineer. Chicago; J. G. Galvin, advertising manager, Kansas City.
- CHICAGO CRUCIBLE Co., Chicago. Graphite crucibles and refractories. In attendance: A. F. Hottinger, J. P. Foraker, W. MacFadden, H. C. Sorenson, J. G. Crowe, J. W. Mann and L. C. Taylor.
- CHICAGO PNEUMATIC TOOL CO., New York. New tandem compound, electrically driven compressor with synchronous motor mounted direct on the shaft, together with a line of vacuum pumps including Crescent Roto-Piston pump for handling sand in foundries; also pneumatic tools such as riveting and chipping hammers, air drills, air grinders, foundry hoists, bench and floor sand rammers, portable electric drills and grinders and all necessary accessories. In attendance: A. E. Goodhue, vice-president, in charge of sales; A. C. Andreson, special representative; G. C. VandenBoom, Chicago district manager; H. C. Gilligan, Detroit district manager; J. L. Westenhaver, Cleveland district manager; R. F. Eissler, Pittsburgh district manager; J. W. McCabe, St. Louis district manager; T. G. Smallwood, Cincinnati district manager; D. R. Hughes, salesman.
- CHISHOLM-MOORE Mrg. Co., Cleveland. Morgan charging machine with Morgan charging bucket and magnet; Cyclone high speed spur geared chain hoists, new improved dust proof models, capacities ¼ to 40 tons inclusive; Matchless adjustable I-beam trolleys, new improved model equipped with Timken tapered roller bear-



ings; also three other types of standard chain holsts and I-beam trolleys; also C-M new improved electric holst. In attendance: W. H. Morgan, J. R. Mears, F. F. Seaman, W. J. Scott and E. S. Ludlow.

- CLARK TRUCTRACTOR Co., Buchanan, Mich. Gasoline propelled Tructractors and Truclift, including low-side Tructractor with automatic end dump body, a gasoline propelled lift truck of three tons capacity and new small towing tractor model, the Duat. In attendance: M. L. Hanlin, vice-president: R. W. Pears, sales representative; J. P. Ware, factory representative.
- CLEVELAND PNEUMATIC TOOL Co., Cleveland. A complete line of foundry tools, such as chipping hammers, sand hammers, portable ball bearing air grinders in two sizes, air drills in 20 sizes, riveting hammers in 15 styles and sizes, core breakers, etc.; also a complete line of Cleco pressure-seated air valves, Bowes air hose couplings, Cleco manifolds—vertical and horizontal types, etc. In attendance: H. S. Covey, secretary; A. Scott, superintendent; J. T. Graves, Ohio representative; R. E. Ahern, manager, St. Louis; H. C. Newton, manager, Chicago; C. D. Garner, manager, Detroit.
- exhibit of core blowing machines. In attendance: \mathbf{H} , \mathbf{L} , Demmler and \mathbf{F} , \mathbf{A} , Demmler.
- DETROIT ELECTRIC FURNACE Co., Detroit. Type LF 200-lb. furnace together with display of products of this company. In attendance: Edward L. Crosby, A. E. Rhoads, D. V. Williamson, F. A. Herrmann, F. P. Weaver.
- DINGS MAGNETIC SEPARATOR Co., Milwaukee. Samples of materials showing typical magnetic extractions; also photographs of installations. In attendance: E. S. Hirschberg, M. A. Beltaire, R. L. Johnstone, J. L. Hope, P. A. Meyer.
- HENRY DISSTON & SONS, INC., Philadelphia. A cold saw machine in operation, demonstrating the Disston interlocking inserted tooth-milling saw; also a metal-cutting band saw in operation; display boards showing files, milling saws, steel, etc., all of Disston manufacture. In attendance: Joseph L. Dorrington, Edward P. Ludy and J. C. Forrest.
- JOSEPH DIXON CRUCIBLE Co., Jersey City, N. J. Graphite crucibles for steel and brass melting, graphite stopper heads, nozzles and sleeves, assay sand crucibles, graphite and silver lead facings, core washes, ingot mold washes



C ENTRAL Section of Milwaukee. The auditorium, where the exhibition is located, is No. 1 on the map with the Pfister and Plankinton Hotels at Nos. 25 and 7. The Union station and the Chicago & North Western stations are at Nos. 28 and 30 respectively

- CLIPPER BELT LACER Co., Grand Rapids, Mich. A complete line of Clipper products, consisting of four models of belt lacers, six sizes of Clipper belt hooks and two models of belt cutters (open and closed end), together with Clipper twisted rawhide and Fibro or bamboo pins; also a Clipper moving belt display which is constructed entirely of aluminum and is practically noiseless when in operation, as all moving parts run on ball bearings; a new product is the Clipper belt cutter made in two models, open and closed ends. Another new product is No. 0 or Baby belt lacer recently put on the market. In attendance: George Farmer and Perl Crothers.
- F. A. COLEMAN Co., Cleveland. Modern type of rolling drawer core oven. In attendance: F. A. Coleman, president and general manager, and Swift Miller, Westtern representative.
- CORN PRODUCTS REFINING Co., New York. A demonstration of making and baking of cores and display of core work in general. In attendance: S. B. Krantz, bulk sales department; F. G. Faller, Jr., H. D. Farris, A. H. Kriescher, D. K. McKinley.

n

- DAVENPORT MACHINE & FOUNDRY Co., Davenport, Iowa. Foundry machines including Davenport roll-overs and Davenport jolt strips. In attendance: A. D. Ziebarth, A. V. Magnuson, Carl Falk, E. J. Byerlein, Charles Scherer and Fred Seemann.
- WILLIAM DEMMLER & BROTHERS, Kewanee, Ill. Working

and refractories. In attendance: A. L. Haasis, sales manager; E. A. St. John, R. F. Leonard, R. R. Belleville, F. R. Brandon, J. E. Thomas.

E

- ELECTRIC WELDING MACHINE Co., Detroit. Weldrite A.C. welding machine. In attendance: Sidney M. Harvey, president; J. C. Wilkie, sales manager; P. V. Peters. Ohio representative; L. A. Ferguson, Indiana representative; T. A. Thomas, engineer.
- ELECTRO REFRACTORIES CORPORATION, Buffalo, N. Y. Tercod crucible, also refractory brick. In attendance: L. U. Milward, W. E. Howard, Western sales manager, and Dell Ramsey, Detroit representative.
- E. L. ESSLEY MACHINERY Co., Chicago. Latest designs of machine tools, such as lathes, milling machines, drills, grinders, shapers, etc., including the products of the following companies: American Tool Works Co. and the Avey Drilling Machine Co., Cincinnati; Barnes Drill Co.; Rockford Milling Machine Co. and Rockford Tool Co., Rockford, Ill.; Diamond Machine Co., Providence, R. I.; Peerless Machine Co., Racine, Wis.; Wilmarth & Morman Co., Grand Rapids, Mich. In attendance: J. R. McDonald, vice-president; J. J. Shanahan, general manager; W. A. McDonald, J. B. Foley and E. J. Burki, salesmen, and E. P. Essley, secretary.
- EUCLID CRANE & HOIST Co., Euclid, Ohio. A small threemotor, floor controlled traveling crane and a small monorail hoist. In attendance: H. H. Kumler, sales

department; F. H. Hulsman, Cleveland sales engineer; R. W. Young, Chicago district manager.

F

- FANNER MFG. Co., Cleveland. Foundry chaplets of all kinds, as well as hard malleable tumbling mill stars and malleable iron push nipples.
- FEDERAL MALLEABLE Co., West Allis, Wis. Rapid molding machines including Rapid plain squeezer and Rapid jolt squeezer making molds to show how the machines operate. In attendance: O. L. Hollister, president; L. C. Wilson, vice-president and general manager; W. J. MacNeill, superintendent; K. H. Siemens and J. P. Wild.
- FOUNDRY EQUIPMENT Co., Cleveland. Portable rack type and rolling drawer core ovens; also enlarged photographs of actual installations in representative foundries. In attendance: C. A. Barnett, vice-president and general manager; H. W. Steindorf, chief engineer; M. A. Beltaire, Jr., C. M. Holcomb and E. J. Byerlein, representatives.

G

- J. H. GAUTIER & Co., Jersey City, N. J. Complete line of black lead crucibles, ranging in size from 0000 to No. 400; special black lead shapes for foundry use, special fire clay shapes, muffles, cupola blocks and fire brick. In attendance: George F. Fynn and H. Richard Aaron.
- GENERAL ELECTRIC Co., Schenectady, N. Y. Various types of electric equipment.
- GLOBE STEEL ABRASIVE Co., Mansfield, Ohio. Samples of different sizes of shot and grit used in the foundry and other manufacturing plants for the cleaning of castings; also samples of small castings showing the condition of the castings before and after cleaning. In attendance: C. H. McConnell, manager of plant.
- Great Western Mfg. Co., Leavenworth, Kan. The Combs gyratory foundry riddle, type V, and also the Combs gyratory foundry riddle, type CS. In attendance: P. L. Wilson, treasurer.
- GRIMES MOLDING MACHINE Co., Detroit. Grimes power rollover molding machine and Grimes hand rollover molding machine; also small Grimes stack molding machine for making small castings, ordinarily made on squeezers, to be poured in a multiple stack, saving molding and pouring labor. In attendance: George L. Grimes, L. V. Grimes, C. J. Skeffington.
- GRINDLE FUEL EQUIPMENT Co., Harvey, Ill. Pulverized coal firing unit consisting of feeder, burner and blower; also photographs, drawings, etc. In attendance: A. J. Grindle, vice-president and general manager; R. H. Bourne, sales manager; M. F. Becker, sales engineer.

H

- R. G. HASKINS Co., Chicago. A complete line of flexible shaft equipments from 1/6 to 1 hp., together with tools and accessories covering all branches of the metalworking industry; also the Haskins Armored work bench, a new efficiency work bench for the machine and assembly shop. In attendance: R. G. Haskins, Milwaukee representative, and Carl W. Schuchardt.
- HAUCK MFO. Co., Brooklyn. Oil burning cupola lighters, mold and skin driers, ladle heaters, preheaters for welding and straightening warped castings, shrink fitting. etc.; oil burning rivet heating forges; high and low pressure type furnace burners for core and annealing ovens, heat treating, etc. In attendance: W. C. Squire and H. Vogelsang.
- HAYWARD Co., New York. Hayward electric motor bucket, class E clam shell, air-operated orange peel bucket for foundry work, and the Hayward feeder cable take-up reel. In attendance: H. M. Davison, general manager of sales; C. S. Sargent, engineer; H. C. Ryder, salesman.
- HERMAN PNEUMATIC MACHINE Co., Pittsburgh. A small working model of one of the company's large jarr independent rollover and pattern drawing machines. In attendance: Thomas Kaveny, president; A. G. Doyle, vice-president; Richard Harris, secretary; R. F. Ringle, works manager; I. J. Oesterling, assistant works manager; T. A. Renkenberger, plant superintendent; Louis Plassmyer, engineering department; Alfred Herman, superintendent pattern shop; C. W. Miller, R. P. Morgan, R. M. Porteous, C. S. McMath, W. W. Hughes and L. L. Johnston, service department.
- HILL & GRIFFITH Co., Cincinnati. A rest room for friends and customers. In attendance: John Hill, president; William Oberhelman, manager, Birmingham; Bruce Hill, sales manager, Cincinnati; M. Z. Fox, manager,

- Chicago; J. H. Lyle, Northwestern representative; G. L. Gysin, Ohio and Indiana representative.
- HILLSIDE FLUOR SPAR MINES, Chicago. Specimens of ore, samples of finished product in bags, photographs of mine and mill with descriptive literature. In attendance: G. H. Jones, president; J. L. Hench, vice-president; M. H. Beatty and R. J. McSherry, foundry sales agents.

I

- ILLINOIS CLAY PRODUCTS Co., Joliet, Ill. Fire clays, test pieces and photographs of plant and clay deposit. In attendance: Paul M. Bechtner, secretary.
- Independent Pneumatic Tool. Co., Chicago. Ther pneumatic drills, chipping hammers, riveting hammers, sand rammers, pneumatic motor hoist, grinders; Ther portable electric drills and grinder, and the UKH Ther electric screw driver, the latter being used for repairing flasks. In attendance: R. S. Cooper, vice-president and general manager; F. W. Buchanan, secretary and assistant general manager; Adolph Anderson, sales engineer; I. T. Cruice, special representative; J. G. Cowell and O. H. Dallman, sales representative; H. E. Nelson, assistant sales engineer, Chicago; S. W. Lanham, sales representative, Columbus, Ohio; H. G. Keller, manager, New York; V. W. Robinson, mamager, Detroit; H. F. White, manager, Cleveland.
- Ingersoll-Rand Co., New York. New high-speed chipping and cleaning hammers, new motor hoists fitted with automatic brakes, pneumatic corebreakers, pneumatic grinders, pneumatic sand rammers, pneumatic drills, air compressors, and pneumatic machines fitted with wire brush. In attendance: George A. Gallinger, George C. Williams, L. W. Schnitzer, W. S. Morehouse.
- International Molding Machine Co., Chicago. Squeezers and combination squeezers; turn-over machines; combination jolt stripping machines, both hand and power strip; combination jolt turn-over machines, both hand and power turn-over; jarring machines; core making machines. In attendance: Edward A. Pridmore, president; William W. Miller, vice-president; Carl Levahn, general foreman; E. G. Borgnis, Hugh Gallagher, M. J. Monahan, Luke S. Shannon, sales department.

J

JOHNSTON & JENNINGS Co., Cleveland. Air squeezers, joit squeezers pattern draw, joit squeezer rollover, joit strippers and plain joits. In attendance: T. J. Calhoun, T. L. Battenfeld, R. W. Gramling, J. D. Riley.

K

- CHARLES C. KAWIN Co., Chicago. Consultations in analytical problems affecting foundry practice and analysis of iron, steel alloys, coke, limestone, coal, etc. In attendance: Charles C. Kawin, president; John Tissing, James Jordan and William H. Griner.
- Keller Mechanical Engineering Corporation, Brooklyn. Keller type F automatic die sinking machine in operation; Keller type R-6 cutter and radius grinder adapted to grinding round cornered milling cutters; Keller type BK flexible shaft grinder for finishing dies, metal patterns and a variety of other work; Keller type BK-2 flexible shaft grinder used for such work as snagging castings; also metal patterns, core boxes and dies cut on Keller machines. In attendance: S. A. Keller, treasurer; Jules Diercks, vice-president and sales manager; A. J. Benson, Charles Bitter and Charles Mertens.
- Spencer Kellogg & Sons, Inc., Buffalo. Core oils, cores and finished castings made with the use of this company's core oils. In attendance: W. L. Goets and J. N. Yaeger, Chicago; E. G. Allen, Cincinnati; J. B. Catherall, New England, and H. J. Strassberger, Buffalo.
- KINDT-COLLINS Co., Cleveland. Pattern shop supplies and equipment, including fillets, glues, shellac, pattern letters, dowel pins, pattern plates; some small machinery, pattern lumber, etc., the main feature being the company's patented master dowel. In attendance: E. T. Kindt and V. I. Kimbel.
- KNEPLER-BATES MFG. Co., Indianapolis. K-B core binder and facing flour including display specimens of cores made with this material. In attendance: Ernest Knefler, president; George B. Hill, sales manager; H. J. Bever and John A. Green, sales representatives.
- CHARLES A. KRAUSE MILLING Co., Milwaukee. Demonstration of Tux core binder showing how it can be used to best advantage for different metals and with different mixtures. In attendance: Mr. Collins, expert foundryman; Fred A. Rech, director of research laboratory;

Mr. Werner, manager of corn mill; Mr. Croal, specialty

L

- LAKEWOOD ENGINEERING Co., Cleveland. A Lakewood tierlift truck, Lakewood tractor, skids and trailers. attendance: Lion Gardiner, sales manager; W. A. Meddick, manager of industrial department; D. E. Van Deusen, industrial engineer, and G. C. Salisbury, sales engineer
- H. M. LANE Co., Detroit. Drawings of foundry layouts. In attendance: H. M. Lane, president; A. O. Thomas, secretary; G. Pitt, architectural department.
- LAVA CRUCIBLE Co. of PITTSBURGH, Pittsburgh. super-refractory furnace cements, lining materials and special furnace shapes. In attendance: P. L. Berkey president and general manager: Furman South, Jr., treasurer and sales manager; D. E. MacLean, C. E. Peck and W. V. Berry, salesmen.
- A 2-point recording LEEDS & NORTHRUP Co., Philadelphia. instrument which has been especially designed for recording the temperature of malleable iron annealing ovens; also an optical pyrometer which has been used extensively for determining the temperature of molten steel in both open-hearth and cupola furnaces. In attendance: Henry Brewer, C. A. Martin and M. E. Griffith.
- LEWIS-SHEPARD Co., Boston. Jacklift elevating trucks, Singlelift elevating trucks, stackers (portable elevators), and steel leg platforms for elevating trucks. In attendance: B. Shepard, Western sales manager; S. A. Milwaukee representative.
- LINDSAY-MCMILLAN Co., Milwaukee. A complete line of core oils and samples of cores made up in various grades of sands and for various purposes. In attendance: Pate, chief chemist: J. A. Gitzen and E. H. Rust, technical engineers: E. W. Carrington, salesman.
- LINK-BELT Co., Philadelphia. A Rapp revivifier, a Link-Belt electric hoist and various types of Link-Belt chain. In attendance: A. G. H. Rapp, engineer, Chicago,
- LOUDEN MACHINERY Co., Fairfield, Iowa. Overhead carrying equipment and cranes, including several improvements brought out since the convention a year ago in Cleve-; also switches, turntables, two-point lift hoists, push and pull cranes, electric hoists and other equipment. In attendance: H. M. Miller, general sales manager; L. E. Berthold and O. L. Rosenthal, Chicago; J. P. Lawrence, Cleveland; John A. Niles, Detroit; Karl D. Kubaugh, Cincinnati; P. L. McCain and L. E. Gaston, Philadelphia.

M

- C. E. McArthur & Co., Chicago. Gagger machine in operation, together with a line of rod straightening and shear machines and a wire straightener machine. In attend-C. E. McArthur, C. L. Stewart and William M. Wilson.
- J. S. McCormick Co., Pittsburgh. Foundry facings, supplies and equipment, including blacking, core wash, core binders, pastes, parting, plumbagoes, facings, etc.; also specimens of work made with Vulcan blacking and cores made and pasted with Lion binder. In attendance: J. S. McCormick, T. E. Malone, S. R. Costley, G. C. Smith, C. C. Bumbaugh, F. J. Buerger and H. D. Fowler.
- MACLEOD Co., Cincinnati. Gravity feed type sand-blast tumbling barrel, a sand-blast cleaning machine, several oil burner outfits and foundry blacking sprayers. In attendance: Walter Macleod, president; James Lauder, engineer; E. C. Held, Milwaukee representative; James Shields, secretary.
- MAGNETIC MFG. Co., Milwaukee. Magnetic separators of various types. In attendance: R. H. Stearns, J. P. Bethke, Harold Harman, R. N. Stearns.
- MALLEABLE IRON FITTINGS Co., Branford, Conn. Small vibrators and a pair of large knock-out vibrators in operation; also one of the company's new vibrator pot rapper for packing malleable castings for prevention of warpage and for economy in packing; also a small working model of a vibrator knock-out device used in connection with sand-cutting equipment. In attendance: G. B. Pickop, assistant superintendent, and Frank Bosky, core shop foreman
- MARSCHKE Mfg. Co., Indianapolis. Floor grinders and snag-
- ging machines for foundry grinding rooms as well as general machine shop. In attendance: W. A. Marschke. Mathews Conveyor Co., Ellwood City, Pa. Heavy duty gravity ball bearing roller conveyors such as are being used in foundries for the handling of molds, chills, castings, pig iron, etc. In attendance: J. H. Hough, sales manager; H. J. Smith, manager of the Chicago office, and F. F. Stoll, manager of the Milwaukee office.
- MERCURY Mrg. Co., Chicago. One type H electric storage battery industrial tractor with separate stand showing

- power plant, also three types of industrial trailers. In attendance: John R. Bensley, vice-president and general sales manager; L. J. Kline, assistant general manager; Arthur G. Leonard, Jr., chief engineer; C. Winslow Henkle, assistant treasurer; William I. Lott, H. B. Clapp, Arthur D. Shanks.
- METAL & THERMIT CORPORATION, New York. metals produced by the Thermit process; also samples of Thermit welds. In attendance: Arthur F. Braid, sales manager metals department, and H. S. Mann, manager Chicago district.
- MICHIGAN SMELTING & REFINING Co., Detroit. line of brass forgings and die castings, ingot brass and bronze, solders and babbitt metals. In attendance: J. R. Searles, president; Henry Levitt, vice-president; Norman Sillman, vice-president; R. R. Arnold, sales manager, and Ira S. Erman, Chicago representative.
- MONARCH ENGINEERING & MFG. Co., Baltimore. No. 92 Simplex tilting furnace with Rockweing device; No. 125 tilting crucible furnace, oil or gas; No. 45 stationary crucible furnace, oil or gas; 250-lb. stationary iron pot furnace, soft metal, oil or gas; 300-lb. stationary iron pot, soft metal furnace, bottom pour, oil or gas; small size tilting or stationary iron foundry cupolette; combination core oven; blizzard sand mixer; combination positive pressure blower and motor with oil pump; No. 1 double chamber furnace, tilting, oil or gas; combination double ladle heater; bottom pour, patent monometer, white metal furnace, for journal bearings or foundry use; continuous motor-driven revolving furnace for melting or smelting. In attendance: George Schimpf, Harry D. Harvey, James V. Martin, Frank Maujean, William D. Harvey, James V. Martin, Raber and William Chenowith.

- NATIONAL ENGINEERING Co., Chicago. Simpson intensive sand mixers, including one No. 2, 6-ft. diameter size in operation; also No. 3, 8-ft. diameter size; also the Newaygo sand machine for aerating foundry sands. In attendance: H. S. Simpson, president; C. D. Hollins, sales manager; B. Castor, master mechanic; C. J. Skeffington, Detroit representative; H. N. Schreuder, Eastern sales representative; G. C. Richards, Pittsburgh representative.
- WILLIAM H. NICHOLLS Co., Brooklyn. Ten different sizes and types of molding machines, including plain jolt machines, jolt squeezers, jolt squeeze and stripping machines and magnetic drawing machines. In attendance: William H. Nicholls, president and general manager; George E. Karl, superintendent, and H. P. Mackinnon, salesman.
- NORMA-HOFFMAN BEARINGS CORPORATION, Long Island City, N. Y. Norma precision ball bearings; Norma ball thrust bearings; the Minimeter, a precision measuring instrument; Hoffman roller journal bearings, standard, self-alining and other types, and Hoffman ball thrust bearings; also one or two pieces of apparatus illustrating the use of Hoffman roller bearings under difficult operating conditions. In attendance: T. J. Harley and Robert Gannett, Western representatives.

- S. OBERMAYER Co., Chicago. An exhibit in observance of the company's golden anniversary; also a new and substitute for foundry nails, and also samples of Black Plast plastic blacking.
- GEORGE OLDHAM & SON Co., Baltimore. Pneumatic chipping hammers, foundry rammers, scalers and riveters. attendance: C. H. Lyle, Milwaukee representative, and. R. W. Nelson, sales manager.
- OLIVER MACHINERY Co., Grand Rapids, Mich. No. 16E band saw, No. 80 variety saw bench, No. 199E surface planer, No. 12AD 16-in. hand planer and jointer, No. 75C pattern milling machine, No. 34E vertical spindle sander, No. 51E motor head speed lathe, No. 52A motor head face lathe, No. 585 oilstone tool grinder, No. 182 portable disk sander, No. 192 band sawing machine, No. 193 saw bench, No. 133B 6¼-in. portable hand planer and jointer, No. 462 electric band saw brazer. Some of these are newly designed machines or machines containing new features. In attendance: C. C. Conklin, manager, Chicago; George C. Ramor, manager, Minneapolis; J. R. Duthie, manager, Cleveland; A. S. Kurkjian, sales manager; M. D. Baldwin, vice-president; C. P. Ziegler, foundry superintendent.
- OSBORN MFG. Co., Cleveland. No. 405-V Osborn jolt rollover pattern draw molding machine; No. 274 Osborn squeezer machine, air operated (portable); No. 177, a new Osborn jolt and squeeze stripper molding machine; No. 401 Osborn jolt rollover pattern draw molding machine; No. 449 Osborn jolt stripper molding machine; No. 422, a new Osborn jolt rollover squeeze pattern draw molding:

machine; No. 75-J Osborn jolt squeeze machine, air operated. In attendance: Franklin G. Smith, president and general manager; E. S. Carman, secretary and chief engineer; M. W. Zeman, sales manager machine division; E. T. Doddridge, J. C. Alberts, F. T. Spikerman, R. E. Kiefer, M. R. Atwater, J. F. Howard, J. D. Wise, sales engineers; R. W. Hisey, assistant works manager; E. F. Oyster, mechanical engineer; Ward Dougherty, service engineer.

Oxweld oxy-acetylene welding and cutting equipment and supplies, Linde oxygen, Prest-o-Lite acetylene and Union carbide; also a new moving picture, "Oxwelding and Cutting—the Universal Tool of All Industry." This picture shows in some detail typical applications of the oxy-acetylene process.

p

- PANGBORN CORPORATION, Hagerstown, Md. Sand blast equipment in operation cleaning castings, etc.; also dust exhauster-arrester equipment in operation, and a complete line of steel abrasives. In attendance: Thomas W. Pangborn, president; John C. Pangborn, vice-president; H. D. Gates, sales manager; P. J. Potter, works manager; F. J. Hull, mechanical engineer; George A. Cooley, Jesse J. Bowen, William T. Randall, Charles T. Bird and W. C. Lytle, district sales engineers.
- PATENT CERMALS Co., Geneva, N. Y. Rex core and facing binder. In attendance: T. K. Fahy, specialty department, and A. N. Duncan, general field representative.
- PAWLING & HARNISCHFEGER Co., Milwaukee. Trolley and operator's cab for overhead electric traveing crane and single line grab bucket.
- Pickands, Brown & Co., Chicago. Solvay foundry coke. In attendance: G. A. T. L. Long, foundry expert, and C. M. Pearson, assistant.
- W. H. PIPKORN Co., Milwaukee. Quigley furnace specialties, Electric Furnace brand fire brick and fire tile shapes, and Wellsville Savage brand fire brick and fire tile shapes. In attendance: W. H. Gaylord, traveling sales manager of Quigley Furnace Specialties Co.; W. G. Gilbert, president of New Florence & Wellsville Fire Brick Co.; W. G. Meyer, assistant manager of W. H. Pipkorn Co.; J. A. Davidson, sales engineer refractory department, W. H. Pipkorn Co.
- PITTSBURGH ELECTRIC FURNACE CORPORATION, Pittsburgh. A ½ ton per hour 'Lectromeit furnace; also representative steel and iron castings made from metal in various 'Lectromeit furnace installations. In attendance: W. B. Wallis, president; R. S. Kerns and H. E. Bromer, assistant sales managers.
- Porcelain Enamel & Mfg. Co., Baltimore. New Pemco metal veneers in mahogany, light and dark walnut, mission green wood and grain effects in porcelain enamels for application to both sheet steel and cast iron parts. In attendance: Frank G. Roberts and Herbert K. Turk.
- Portage Silica Co., Youngstown, Ohio. Samples of various grades of steel molding, core and sand blast sands, also a sample of the company's silica conglomerate rock in its natural state. In attendance: E. E. Kloos, vice-president and general manager; L. R. Farrell, secretary and sales manager; C. F. Eberhart, chief clerk.

Q

QUIGLEY FURNACE SPECIALTIES Co., New York. Hytempite, a high temperature cement for bonding refractory materials; Ganisand, a highly refractory ganister used for rammed-in linings by bonding with Hytempite and for making special shapes; a new refractory product, Mono-Line, a ready-to-use ganister which carries its own natural binder and especially adapted for lining pit furnaces, tilting crucibles and open-flame furnaces; also Insulbrix and Insuline products used for conservation of heat in furnace structures. In attendance: W. S. Quigley, president; W. H. Gaylord, Jr., traveling sales manager; D. F. McMahon, service engineer.

R

- RACINE TOOL & MACHINE Co., Racine, Wis. Racine high speed metal-cutting machines, including sizes from 4 in. to 12 in. capacity; Racine duplex band saw machine in several different models for the cutting of brass and aluminum castings, pattern work and other uses; and a special foundry cutting machine for handling large steel sprues, In attendance: M. E. Erskine, president; J. M. Jones, sales manager; William C. Reinhardt, superintendent: A. B. Carmen, demonstrator.
- READING CHAIN & BLOCK CORPORATION, Reading, Pa. An electric hoist of 1-ton capacity. In attendance: F. H. Howard, president, and Fred A. Howard, treasurer.

- REPUBLIC CARBON Co., Milwaukee. A rest room and meeting place for friends and customers. In attendance: R. L. Baldwin, manager of sales; F. E. Clark, sales engineer; W. G. Berlin and A. F. Preuster, service engineers.
- RICHARDS-WILCOX MFG. Co., Aurora, Ill. No. 925 ball bearing I-beam trolleys for handling loads up to 4 tons; also complete line of I-beam monorail equipment and trolley track equipment, including switches, curves, turntables, etc. In attendance: W. H. Fitch, president; P. L. Hoffman, superintendent; E. J. G. Phillips, chief engineer; A. J. Eggleston, manager Chicago branch; C. Riemenschneider, Chicago; A. J. LaFleur, manager engineering service; A. W. Thurow, assistant manager engineering service.
- Robeson Process Co., New York. Various core binders, also cores and castings of various shapes and sizes. A demonstration of the company's binders as used in various sands and under varying foundry conditions. In attendance: G. I. Lindsay, S. T. Adair, T. J. Ryan, T. J. O'Hara, J. A. Smith, B. W. Bullen.
- Rocers, Brown & Co., Cincinnati. Iron castings in which Cicoa charcoal iron has been used, as well as samples of aluminum, brass, sand, coke and other commodities handled by this company. In attendance: F. W. Bauer, J. C. Mears, A. B. Weaver, E. A. Rudolf, C. E. Trommer, L. W. Hoefinghoff, W. E. Oelschlaeger, Chicago; A. M. Barker, St. Louis; Harwood Wilson, Cleveland; Thomas A. Wilson, Pittsburgh; George R. Sullivan, Philadelphia; R. T. Melville and A. F. Stengel, Buffalo; F. E. Fitts, Boston; J. A. Claussen, New York; A. J. Wentworth and J. R. Morehead, Cincinnati.
- P. H. & E. M. Roors Co., Connersville, Ind. Latest model of Roots cupoia charging hoist; also Roots foundry blower. In attendance: E. L. Hiatt, assisted by W. L. Sexton, Chicago; D. R. Schively, Cleveland, and Louis Oakley, Connersville.
- ROSS-TACONY CRUCIBLE CO., Tacony, Philadelphia. Graphite crucibles for melting steel and all non-ferrous metals; graphite stopper heads for bottom pour ladies, graphite nozzles, sleeves, special shapes, etc. In attendance: Charles C. Bacon, secretary; C. S. Orne, Jr., and I. R. Robinson.
- RODINSON.

 ROYER FOUNDRY & MACHINE Co., Wilkes-Barre, Pa. Royer sand separator and blender, models B, C and D; also company's new sand preparing plant. In attendance; G. F. Royer, president; John Lloyd, vice-president, and J. P. Cosgro, Western representative.
- RUEMELIN Mro. Co., Minneapolis, Minn. Square sanitary sand blast cabinets, portable midget sand blast guns and helmets, high pressure sand blast generator, sand sifters and exhaust fans.

8

- SAFETT EQUIPMENT SERVICE Co., Cleveland. Accident prevention equipment for the foundrymen such as leggins, foundrymen's shoes, aprons, goggles, etc.; also a new type of leggin said to be superior to any now in use both from the standpoint of comfort and safety. In attendance: B. W. Nutt, president.
- SAFETY FIRST SHOE Co., Boston. Sample pairs of Safety First shoes which are especially constructed to protect the feet of workmen employed in foundries, blast furnaces, steel mills, etc. In attendance: Edgar C. Davidson, sales manager.
- SHEPARD ELECTRIC CRANE & HOIST Co., Montour Falls, N. Y.
 Two cupola charging monorall hoists, one of these a
 cage controlled machine of 3 tons capacity and the other
 a floor controlled machine of 2 tons capacity; also an
 umbrella-type dump bucket for use in conjunction with
 the cupola charging hoist; also a drop bottom bucket
 for the same use. In attendance: F. A. Hatch, vicepresident and general manager; R. H. McGredy, secretary and sales manager; G. L. Drake, foundry specialist;
 W. B. Briggs, Chicago district manager; J. D. Gillette,
 Detroit district manager; H. D. Crout, engineer.
- SKEPPSTEDT-ERICKSON Co., Moline, Ill. Types A and B Skeppstedt multiple core machines in operation; also the Skeppstedt adjustable core bench, sample castings and sample cores. In attendance: E. G. Erickson and Olof Skeppstedt.
- W. W. SLY Mro. Co., Cleveland. Slyblast room equipment for sandblast, shotblast and gritblast; also latest design humane type Slyblast turntable cabinet and tilted model of positive pressure Slyblast mill; also a battery of two Slyblast tumbling mills, one square mill and one round mill; and small working model of the Sly dust arrester for use in connection with sandblast and tumbling mill equipment in factories and other plants. In attendance: S. C. Vessy, president; F. W. Klatt, general manager; G. A. Boesger, chief engineer; F. A. Ebling, sales manager, and following representatives: D. P. Carter and

- D. L. Harris, New York; C. P. Guion and R. O. Mullen, Chicago; M. T. Mortensen, Detroit; W. L. Kammerer, St. Louis; R. W. Hasselle, Chattanooga, Tenn.; S. C. Bratton, Birmingham; P. H. McArdle, New Orleans; Mr. Frost, Minneapolis; H. R. Atwater, Los Angeles, and Mr. Ross, Seattle.
- Werner G. Smith Co., Cleveland. Samples of Linoil and other core oils; also specimen cores from foundries using these oils, and castings made with sand cores. In attendance: Werner G. Smith, president; Milton S. Finley, vice-president; Frank Dodge, Detroit representative; L. P. Robinson, Boston representative; John M. Glass, Indianapolis representative; M. M. Werckman, Dayton, Ohio, representative; George J. Graham, Philadelphia representative; E. H. Heartlein, Moline, Ill., representative; Charles Ellis, Canadian representative; William Rayel, service expert; Wallace Alexander, chief chemist; Louis F. Ferster, advertising manager.
- Spencer Turbine Co., Hartford, Conn. A Turbo compressor, capacity 2700 c.f.m. at 1 lb. pressure; and a Turbo compressor of 450 c.f.m. at 1½ lb. pressure; and another compressor, capacity 125 c.f.m. at 1 lb. pressure; these Turbo compressors being designed for supplying air for foundry cupolas and oil and gas burning industrial furnaces. In attendance: H. M. Grossman and O. J. Dingee.
- STANDARD HORSE NAIL Co., New Brighton, Pa. A display of foundry nails. In attendance: R. C. Hutchings, general sales manager.
- STANDARD RADIAL BLAST CORPORATION, New York. One No. 3 36 x 44-in. standard Radial blast sand-blast barrel, motor driven, with a fully inclosed motor. In attendance: Charles S. Johnson, general manager, and John R. Sheldon, engineer.
- STERLING WHEELBARROW Co., Milwaukee. Flasks, wheelbarrows and foundry specialties. Automobiles provided for the purpose of taking visitors to the company's plant in Milwaukee. In attendance: H. J. Felsburg, Philadelphia district manager; G. H. Lambkin, New York district manager; J. M. Dickson, Cleveland district manager; J. J. Coyne, Chicago district manager; H. H. Baker and R. F. Jordan, factory representatives.
- FREDERIC B. STEVENS, Detroit. A Stevens Swartwout portable core oven and a new type Mitchell grinder. In attendance: All of the officers of the company and a number of its salesmen.
- STONEY FOUNDRY ENGINEERING & EQUIPMENT Co., Cleveland. A new type Stoney high speed molding machine as well as two core machines; also the Stoney patent shakeout bail and a special large shakeout vibrator and the Stoney patent core knockout machine. In attendance: John T. Stoney, R. E. Stoney, E. S. Cohen, L. J. Reinhard and George Gage.
- N. A. STRAND & Co., Chicago. A full line of flexible shaft grinding equipments—motor and belt drive—ranging in capacity from 1/10 to 2 hp.; also several attachments for operating through flexible shaft drive. In attendance: N. A. Strand, O. V. Strand and C. W. Blakeslee.
- SULLIVAN MACHINERY Co., Chicago. An angle compound type of belt-driven air compressor in operation to supply air at 80 lb. pressure for exhibitors; also a Sullivan straight-line, single-phase, belt-driven air compressor and two types of portable drum hoists. In attendance: Joseph H. Brown, Chicago district sales manager, assisted by E. W. Noyes.
- SWARTWOUT Co., Cleveland. Model electric core oven. In attendance: C. F. Mayer, manager oven department; G. S. Montgomery, Chicago; N. P. Sanborn, factory representative.
- WILLIAM SWINDELL & BROTHERS, Pittsburgh. A complete 1000-lb. Swindell electric melting furnace, including the furnace proper completely lined, ready for operation; also complete switchboard equipment, automatic control electrode mechanism, mast equipment, etc. In attendance: E. H. Swindell, F. W. Brooke, J. F. Baker, R. W. Porter, W. H. Cosgrove, H. C. Bement, E. A. Hanff.

T

- Tabor Mfc. Co., Philadelphia. Tabor molding machines, including plain squeezer, jar squeezer, shockless jar squeezer, standard split pattern machine, new shockless jar stripping machine, plain shockless jarring machine, plain jarring machine, plain jar roll-over machine and shockless jar roll-over machine, some of these machines being of new design. In attendance: Wilfred Lewis, president; H. W. Brown, secretary; J. T. Ramsden, chief engineer, and the following salesmen: James H. Coleman, H. W. Impey, William E. Sewell, John Pfender, E. Sydney Lewis, T. L. Sumner, P. J. Shire.
- TRUSCON STEEL Co., Youngstown, Ohio. A complete foundry flask line showing the smallest bench flask to the large

types handled by power cranes; also core racks, core plates, bottom boards, steel boxes, conveyor flights, lift truck platforms, etc. Photographs of standard steel buildings, steel windows, all types of concrete reinforcing, steel joists, Hy-rib and metal lath, concrete road products, and a complete line of home building products, such as casement and basement windows. In attendance: I. S. Leland, Milwaukee; H. W. Jencks, Detroit; J. C. Peirce, Chicago; G. E. Madden, Pittsburgh; G. E. Snedeker, New York; C. H. Watt, Boston; L. S. Todd, Cleveland; J. P. Quinn, Buffalo; N. C. Ferreri and P. A. Nuttall, Youngstown.

U

- UNITED COMPOUND Co., Buffalo. Buffalo brand vent wax. pattern wax and Buffalo corrugated gaggers. In attendance: John W. Bradley, L. F. Leney and William F. Bradley.
- United States Graphite Co., Saginaw, Mich. Various grades of Mexican foundry facings and plumbagoes, as well as a display of U.S.G. motor and generator brushes and other carbon products. In attendance: J. G. Drought, R. A. Corrington, R. J. Edmiston, G. D. Robinson.
- UNITED STATES SILICA Co., Chicago. Flint Shot sand blast abrasive and samples of the cleaning work done by this abrasive; also Bacharach flow meter demonstrating its connection to sand blast equipment. In attendance: Volney Foster, president; H. F. Goebig, secretary; O. M. Olsen, field sales manager, and Fred Paul.

V

VIBRATING MACHINERY Co., Chicago. A Sandhog electric sand shifter, model 1924. In attendance: Julius Schroeter, president.

W

- Waldo, Egbert & McLain, Inc., Buffalo and Boston. Samples of various kinds of pig iron, coke, coal and sheet steel. In attendance: Fred J. Waldo, president; Justus Egbert, vice-president; Loring G. Calkins, vice-president and New England manager; M. F. Selbert, assistant secretary; H. R. Defler, F. E. Gross, C. S. Siebert, Buffalo representatives; C. F. Hutchins, Boston.
- J. D. WALLACE & Co., Chicago. A complete line of Wallace machines, including 4-in. and 6-in. jointers, universal, plain and 16-in. band saws, 6-in. lathe, spindle and disk sanders and Wallace automatically controlled solder and glue pots; also a demonstration of pattern making. In attendance: J. D. Wallace, president; H. L. Ramsay, sales manager; C. D. Grey, field manager; S. N. Brickhouse, district manager, and Robert Bain, pattern shop foreman.
- WATSON ENGINEERING Co., New York. Transparencies on screens, together with photographs, pamphlets and other general advertising matter representing the work accomplished by the Watson Engineering Co. and the Watson Co. in foundry design. In attendance: R. A. Spengler and Stanley H. Chadwick.
- Westinghouse Electric & Mfg. Co., East Pittsburgh. Arc welding motor generator set and welding booth in operation; safety switches; Micarta and Industrial motors; space heaters and glue pots. In attendance: M. E. Mann and C. D. Pence, sales headquarters; P. McShane, engineering headquarters, and R. R. Davis, publicity representative, East Pittsburgh.
- WHITING CORPORATION, Harvey, Ill. New type of air hoist; new grab bucket for handling foundry sand; steel plate tumbling barrel fitted with clutch and brakes (with motor); helical-worm geared ladle; Solenoid and foot brakes for electric cranes; photographs, drawings, etc. In attendance: J. H. Whiting, president; R. H. Bourne, vice-president and sales manager; A. H. McDougall, vice-president and consulting engineer; G. P. Fisher, foundry superintendent; R. E. Prussing, sales engineer; J. S. Townsend, mechanical engineer; R. E. Ludwick, sales engineer.
- G. H. WILLIAMS Co., Erie, Pa. No. 3 1/4-yd. foundry bucket and a 1/4-yd. Favorite bucket; also a miniature crane with the Williams foundry bucket on it. In attendance: C. D. Buoy, T. D. Harter, Arnold Hooper, G. E. Monroe.

Y

Young Brothers Co., Detroit. A new type conveyor oven unit especially adaptable for limited core output, and also adaptable to any heating method; also a working model of the well known Pullman conveyor type core oven installation and a standard laboratory oven complete with automatic temperature control and recording devices in operation. In attendance: R. B. Reed, sales manager; V. A. Fox, chief engineer; T. P. McVicker, Chicago manager; H. M. White, Michigan manager; C. G. Lisch, Cleveland manager; P. A. Meyer, Buffalo manager.

Studebaker Gray Iron Foundry Largest

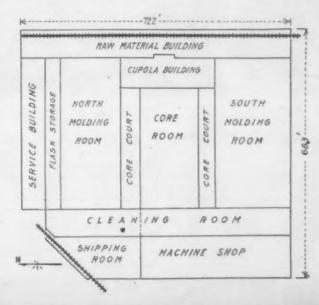
Raw Material Storage Bay Entirely Covered and Inclosed—Special Sand Storage and Handling Features—Provisions for Illumination, Heating and Ventilation Are Noteworthy

BY GILBERT L. LACHER

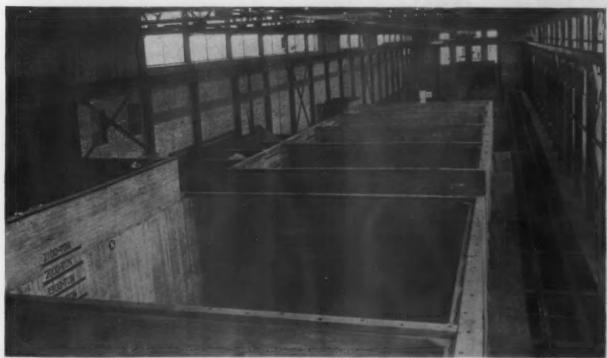
THE largest unit foundry in the country just completed by the Studebaker Corporation, South Bend, Ind., measures 683 by 722 ft., covering 11 acres of ground space and embracing over 13 acres of floor area. The plant commands attention not only for its mammoth size, but also for its excellent layout, its labor-saving equipment, its unusual illumination and its ventilating and heating facilities. One of its outstanding features is the raw material storage bay, an entirely covered and inclosed structure where metal,

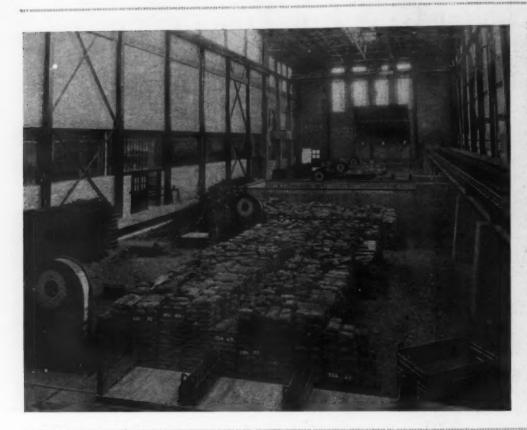
fuel and sand are protected from the elements. Similarly a large shipping floor is under cover so that both deliveries of raw materials and shipments of castings are made indoors. Between these two bays, located at opposite sides of the plant, the other departments are arranged for the most direct routing of materials. Fireproof and of the most substantial construction throughout, the building contains 4500 tons of structural steel, being faced with brick. In the side walls and monitors are over four and one-half acres of continuous sash, or

THE Raw Material Storage Bay (Below) Is an Entirely Covered and Inclosed Structure. Eight concrete sand storage bins have a combined capacity of 450 cars of sand, or more than enough to carry the foundry through the winter. Underneath an elevated track, shown at the right, are three coke bins with storage space for 150 carloads. In the left foreground may be noted the cupola charging platform, which projects into the material bay. Just beyond against the left wall are three steel hoppers which form a part of the core sand mixing system. Farther along the same wall is a concrete bin used to transfer molding sand into the molding room



Plot Layout of the Entire Foundry Plant, Showing Location of Both Core Room and Cupola Building Between the Two Big Moiding Rooms and with Easy Access to Each. The cleaning room, across the west end of the two moiding rooms, is well located on the route of the castings to the machine shop adjoining. From here they pass north into the shipping room and thus out. At top of the diagram appears the projection of cupola charging platform into raw material building, as shown in the view below



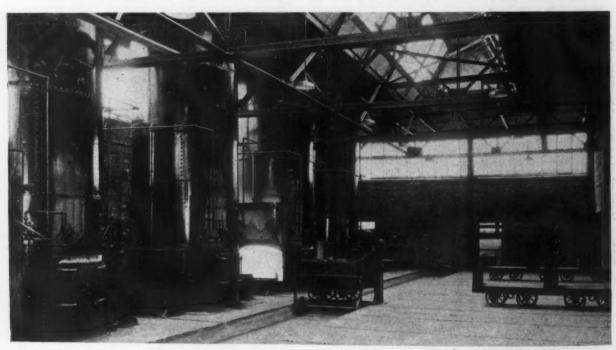


Pig Iron and Scrap Storage Space for 280 Cars of 50 Tons Capacity Each Has Been Provided in the Material Bay. Metal is delivered from an elevated track, under which the storage space extends. The iron yards are divided into parallel sec-tions, each served by a narrow-gage buggy track and a 5000-lb. track scale, where charges are made up and weighed and then advanced to a transfer track connecting with the cupola elevators. At the end of the building is one two refuse bins which discharge their contents out-side the building into motor trucks for final disposition. The open pit in middle distance connects with one of the tunnels pass ing under the plant

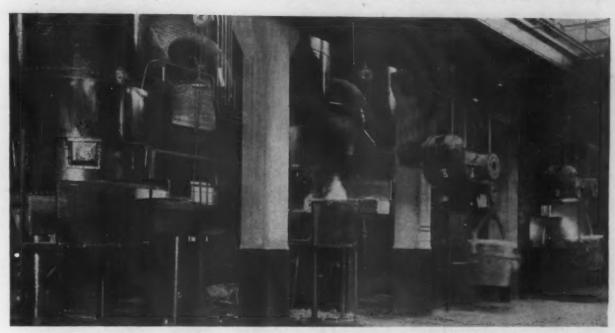
one square foot of glass to illuminate every three square feet of floor space.

Designed to produce 500 tons of finished gray iron castings daily, or the entire requirements of both the South Bend and Detroit works of the Studebaker Corporation, the foundry will employ fully 900 people, of which 60 will be women. At present equipped for intermittent production, the plant is so planned that it can be easily converted into a continuous foundry.

The material handling bay, located on the east side of the building, is 75 ft. wide, 722 ft. long and 60 ft. high. Raw materials are delivered inside the bay on a railroad track elevated 10 ft. above the floor. Coke is discharged from the cars into three concrete storage bins located under the track, extending 10 ft. below the floor level, making their depth from track to bin bottom 20 ft. Having a combined capacity of 150 carloads, the three bins are separated by two weighing stations



The Foundry Is Equipped with Four Cupolas with a Melting Capacity of 14 to 20 Tons an Hour. Each cupola has doors on both sides, pneumatically lifted, and is served by pneumatically operated charging machines. The charging floor has 18 tracks with a capacity for 150 charging buggies. Charges are distributed to the various charging machines by means of a transfer track. Through labor-saving equipment the charging force has been reduced to nine, as compared with 32 at the company's old foundry



Five-Ton Cab Cranes Mounted on a Monorail System 5300 Ft. Long Are Used to Distribute Hot Metal, as well as Cores, to the Molding Floors

where narrow-gage buggies are filled with coke, passed over 2000-lb. Toledo scales and rolled over narrow-gage tracks through tunnels on to Haughton 10-ton motor-driven elevators. There are two of these elevators, one for each tunnel, and they deliver the buggies at opposite extremities of the cupola charging floor. The elevator floor is equipped with narrow-gage tracks which coincide with tracks on the charging floor as well as in the tunnels.

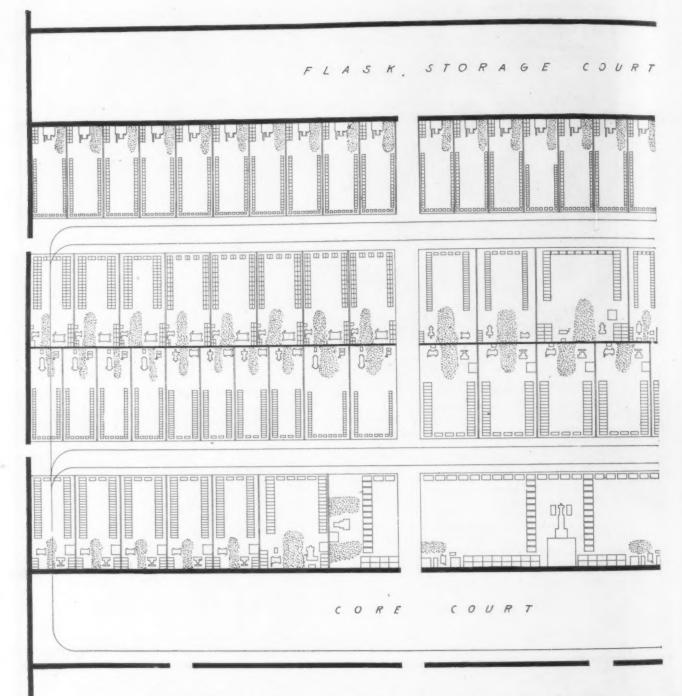
Iron storage for 280 cars of 50-tons capacity each has been provided on the floor level at both ends of the material bay. Both pig iron and scrap are delivered from the elevated railroad track under which the storage space extends. The iron yards are divided into bays, each of which is served by a narrow-gage buggy track and a Toledo 5000-ib. track scale. Here iron charges are made up and weighed, whereupon the buggies are rolled on to a Whiting electric transfer car which operates on track extending along the west side of the material building. The conductor angle from which the transfer car is operated is located underneath the adjoining concrete floor so that there is no possibility of any one walking on it. The transfer car delivers the buggies of iron to the same elevators used for raising coke buggies to the charging floor.

One of the most impressive features of the raw material building is the sand storage department. Situated between the iron storage yards are eight concrete sand storage bins, two of them, 40 x 40 ft. x 37 ft. deep, and six, 20 x 40 ft. x 37 ft. deep, all extending 10 ft. below the floor level. Having a combined capacity of 450 cars of sand, they are amply large to carry the foundry through the winter or for a period of six months for that matter.

Sand is handled by means of a 5-ton Shaw electric traveling crane equipped with a 1½ cu. yd. grab bucket. There are also two 10-ton Shaw cranes in the material building, each equipped with a 60-in. magnet for handling pig iron and scrap. Fresh sand is transferred to the molding rooms through concrete bins projecting through the wall. On the molding room side these bins are open at the front to facilitate drawing upon them for supplies. Core sand is transferred from storage to three hoppers from which given quantities are drawn, mixed and then elevated by skip hoist to the second floor of the adjoining cupola building, where the material is discharged through a swinging chute to one of a battery of No. 2 Style B Simpson mixers, furnished by the National Engineering Co., Chicago. Core oil is introduced into the mixers by gravity from a small



In the Core Room Are 16 Octagonal Core Benches and Three Long Benches for "Chunk" Cores, Each Supplied with Sand from Balconies Above Through Sheet-Metal Chutes. Three oil-fired core ovens, one shown in background, are equipped with a special type of induction draft in the chimney to insure uniform heat, regardless of atmospheric conditions



Detail Plan of Molding Floors and Benches in the North Molding Room. At right are the entrances from the at left give access to the cleaning room. The cupola building is at the lower right corner (not indicated

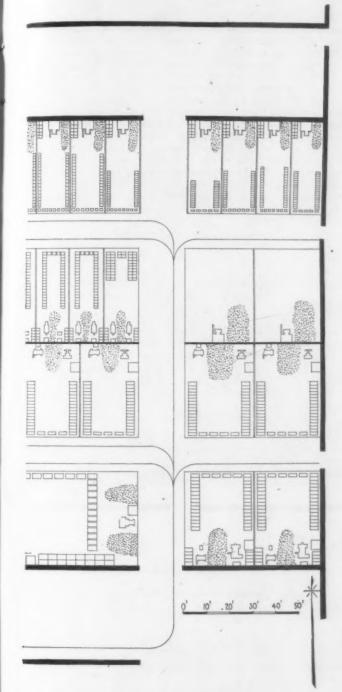
tank, which in turn is served by pump from a 10,000-gal. storage tank located at one extremity of the material building. The mixers are situated on a platform so that core sand buggies may be pushed underneath to be filled. The buggies are then rolled on to balconies over the core room from which the sand is discharged into sheet-nietal chutes serving the core benches.

Facing sand is handled in much the same manner as core sand, being drawn from hoppers for mixing and then elevated to a battery of Simpson mixers located on the second floor of the cupola building opposite the core and mixing room. After mixing, the facing sand is run by conveyor through a Rapp revivifier and is then discharged into a two-compartment steel bin located on the main floor of the building. Sand is drawn from the bin through drop bottom doors. Two kinds of facing sand are used, one for cylinder castings and the other for various small castings requiring facing, such as oil pump bodies. Hence the two compartments in the bin. One kind of facing sand is discharged from the end of the continuous conveyor

extending from the revivifier. When the other kind is being mixed a deflector is put across the conveyor belt to plow the sand off into another chute leading to the opposite half of the bin.

The cupola charging floor is on the third floor of the cupola building, which is located directly west of the central portion of the material bay. Here laid in the concrete floor are 18 tracks, which will store 150 charging buggies. A transfer track located in front of the cupolas and running at right angles to the storage tracks permits the transfer of buggies from elevators to the charging floor and from charging floor to the cupolas. The charging platform projects into the material bay so that if the elevators are ever put out of service the material cranes may be used to convey iron and coke from material storage to cupola.

There are four No. 9½ Whiting cupolas lined downed to 72 in. in diameter and with a melting capacity of 14 to 20 tons an hour each. Space has been allotted for two additional cupolas—one at each end of the present battery. Each cupola has two doors—one on each side—and these are pneumatically lifted.



raw material storage building, while the doorways on the drawing) and the core room at the bottom

Whiting charging machines pneumatically discharge the buggies into the open doors. Through labor saving equipment the charging force has been reduced to 9, as compared with 32 men at the old foundry.

Blast for the cupolas is furnished by three blowers built by the Spencer Turbine Co., Hartford, Conn. They deliver 11,000 cu. ft, of air per min., and are individually driven by 125-hp. Crocker-Wheeler motors. Two instruments supplied by the Bacharach Industrial Instrument Co., Pittsburgh, record the volume and pressure of the cupola blast.

Storage space for fire clay and fire brick has been provided on the first floor of the cupola building.

Directly west of the cupolas is the core room, on either side of which are two molding rooms, identical in size. Fifty-three hundred feet of monorail, equipped with 5-ton Shepard cab cranes, is used to distribute ladles of iron and core racks to the molding floors. Each molding room comprises four bays 47 ft. wide and 400 ft. long. Between each molding room and the centrally located core room is a court for the storage of cores ready to be transferred to the molding floor. All

cores in the courts are arranged on racks equipped with casters and eye-bolts, the latter to facilitate handling by monorail crane and the former to permit rolling the racks about on the molding floors. In the core room, however, green cores, outside of a special type called chunk cores, to be referred to later, are handled in stationary racks, being transported to and from core ovens by Elwell-Parker lift tractors. Baked cores are transferred from the stationary to the castor-type racks after they have been filed, pasted, gaged and inspected. The fact that cores are on a castor rack, therefore, is proof of inspection.

Molding Floors Segregate Castings

Every molding floor has been assigned the molding for a particular type of castings. For ramming the copes on crank cases for the company's Big Six and Standard Six cars, Beardsley & Piper sand slingers are employed. A jobbing floor 40 x 47 ft., containing a pit, 20 x 40 ft. x 4 ft. deep, has been set aside for pit molding. This is done chiefly to supply castings for equipment in the manufacturing plants, such as large dies for the forge shop.

For the conveyance of castings from molding floors to cleaning room four parallel tunnels have been provided, two under each molding room. The tunnels are located so that they project on each side of the columns dividing the molding bays. In this fashion each row of molding floors has access to the tunnels, there being one connecting manhole for every floor. After castings are poured and shaken out they are passed down chutes into boxes on buggies in the tunnel below. Each tunnel is 30 ft. wide, 10 ft. high and 450 ft. long, extending into open pits in the cleaning room at one end and the material bay at the other extremity. The castings may be elevated to the cleaning room either by Haughton hydraulic elevator or by overhead electric crane. The tunnel manholes are also used for discharging refuse, scrap, sprues, gates, etc., from the molding floors. Buckets of refuse are transported to the material room, where they are hoisted by overhead crane and discharged at either end of the bay into refuse bins for outside conveyance. Dust from the cleaning room is handled in the same way. Gates and sprues are run through a Sly tumbling barrel, situated at the end of one of the tunnels. After cleaning, the sprues and gates are ready to be put back in the cupela, while the dirt removed from them is transferred to the refuse bins. Buggies are hauled through the tunnels by Mercury storage battery tractors.

Flasks are stored in a bay north of the north molding room. At one end of this bay are charging boards for the plant's fleet of storage battery tractors. This department is served by a 3-ton Shaw electric crane. For handling flasks and other heavy work in the molding bay six 3000-lb. hand power cranes have been provided. Built by the Chisholm-Moore Mfg. Co., Cleveland, the cranes have an unusual length of span, 43 ft. 6 in., and are 19 ft. 3 in. above the floor. They are chain operated, as is usual with a handpower crane, but have direct drive instead of through gears. The bridge consists of a 15-in. I-beam set in trucks at either end. The trucks are built of channels set back to back with wheels between, equipped with SKF self-alining ball bearings. The trolley is equipped with Timken bearings. An air hoist is suspended from the trolley.

Core Room Centrally Located

The core room, which is in the middle of the plant, measures 160 x 320 ft. The concrete floor is covered with "copper stone," a surface coat of cement containing copper ore which is harder and stands up better under traffic than ordinary cement. Sixteen octagon core benches and three long benches for chunk cores are supplied with sand through sheet metal pipes from the sand balconies suspended above. There are also five Demmler core machines. A battery of 10 core ovens is used exclusively for chunk cores. This core, which is for the crank case and cylinder barrel for the Standard six-cylinder car, weighs 80 lb. The chunk core ovens are of the break-down type, while two other batteries of 12 compartments each are of the rack type, having space for two racks in each compartment. The

ovens, which were built by Holcroft & Co., Detroit, are of brick construction with steel doors insulated with asbestos. Pyrometers on each oven are used to maintain a temperature of between 450 to 500 deg. Fahr. A special induction draft in the chimney permits the ovens to produce as well in damp weather as on fair days. In tunnels underneath the floor are two firing pits for the chunk oven and pits for the two other ovens. Nebulyte oil burners, manufactured by the Anthony Co., New York, are used, and the fuel oil is pumped from three 10,000-gal. tanks, both tanks and pump house being located outside the plant. Connecting with the firing pit tunnels are two fan rooms, one for two pits, which supply the forced draft for the ovens.

Also connecting with the tunnels under the foundry are seven fan rooms used in connection with the heating and ventilating system. Extending from the fan rooms to the roof are steel vents equipped with regulators both on the side and on the top so that air may be drawn either from the outside atmosphere or from the foundry. In the fan rooms the air is drawn through hot water coils and discharged through the building columns into the foundry above. Each fan room is equipped with a No. 10 duplex conodial fan manufactured by the Buffalo Forge Co., Buffalo, N. Y The blast from the fan rooms passes through a total of 33,698 sq. ft. of hot water radiation. In addition there are 97,096 sq. ft. of direct radiation suspended under the roof to temper the air. Hot water is supplied from the company's power plant, but as a protection against any interruption in supply from the main source an auxiliary hot water system has been provided. Well insulated hot water storage tanks which are always kept full, are located on the first floor of the cupola building.

Ventilating and Heating

Atmospheric circulation created by the heating system, is also promoted by continuous sash in the moni-

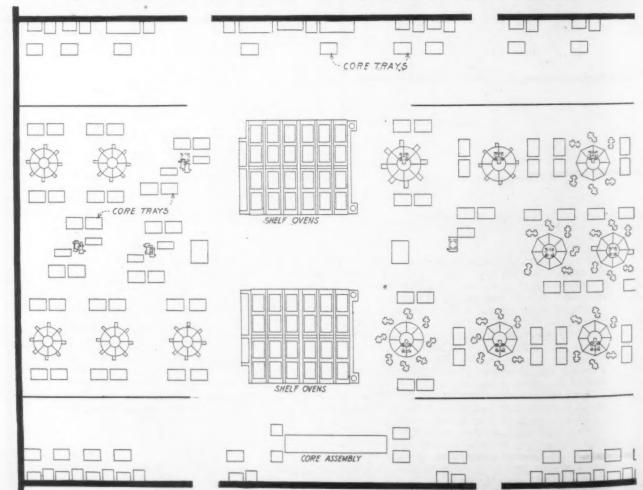
tors and side walls. All of the sash in the foundry, cleaning room, machine shop, shipping bay and material bay is electrically operated. The electrically-driven window operators, like the windows and sash, were manufactured by the Truscon Steel Co., Youngstown, Ohio. Push buttons located at nine stations on the floor, open and close entire runs of sash. The longest run, 600 ft., is in the material bay. Various buttons have been provided for different purposes. By pressing one button sash may be opened, stopping automatically at a full opening. Another button will stop the sash in any position desired. A third button will close a given run of sash. A single row or all the windows of a run of sash may be operated at one time. Sixty-six motors are required to control the windows. The push button stations are kept locked and are in charge of one employee who controls the ventilation of the entire foundry.

As much attention has been paid to the floor construction as to the heating and ventilation. The floor of the core room has been mentioned. In the molding rooms the floor is of brick containing a special composition of fire clay to prevent burning by the molten metal. The joints in the brick are filled to half their depth with asphalt. Molding sand fills the remainder of the joints and covers the surface of the brick. Creosoted wood block floor has been laid in the flask storage bay, the cleaning room, machine shop, shipping room, pattern shop and pattern storage.

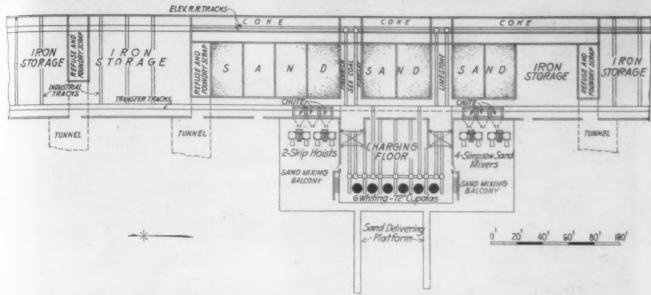
Thirteen wash rooms and toilets, distributed throughout the plant, are located on balconies reached by steel stairs, to conserve the space beneath for storage purposes.

Cleaning Castings

The cleaning room, 80 x 662 ft., is located at right angles to the molding rooms, and is divided into a series of departments, there being a single line of tumbling barrels for each kind of heavy castings. There are two parallel overhead crane runways in the room,



Plan of Core Room, Showing Location of the Sixteen Octagonal Core Benches, the Three Batteries of Control Equipment. This room is situated between the two molding rooms, separated from them by "core courts," through



Layout of Raw Material Storage, the Cupola Charging Floor and Sand Mixing Equipment. The arrangement of buggy tracks on the charging floor, with turntable switches, shows how material is brought to the cupolas

each mounted with a 5-ton Shaw electric traveling crane. Castings are elevated from the tunnels either by the cranes or by hydraulic elevators previously mentioned. The tumbling mills in the room were all furnished by the Whiting Corporation, Harvey, Ill., and are in three sizes—30 x 48 in., 36 x 72 in., and square mills, 33 x 33 in. x 72 in. long. The grinding and polishing machinery was manufactured by the Marschke Mfg. Co., Indianapolis, and sand blast and shot blast equipment was built by the Pangborn Corporation, Hagerstown, Md. The mills are belt-driven from line shafting, while the other machines have individual motor drive. A dust collecting system serving

the equipment is connected with a tunnel running down the center of the room. The tunnel, in turn, leads to seven dust arresters located on the west side of the room. These, which were installed by the Dust Recovering & Conveying Co., Cleveland, catch the dust, which is drawn off into buckets and conveyed through the traffic tunnels to the refuse bins in the material bay.

The machine shop, parallel to and west of the cleaning room, is 120 x 400 ft. Here all castings for shipment to the Detroit plant are rough-turned except flywheels which are finished complete. Rough turning frequently uncovers flaws in the castings not apparent on the surface. Obviously if such castings are rejected before they are shipped, freight is saved in both directions, as the Detroit plant has no foundry and formerly had to ship back rejections as scrap. The equipment in the machine shop is operated by line shaft.

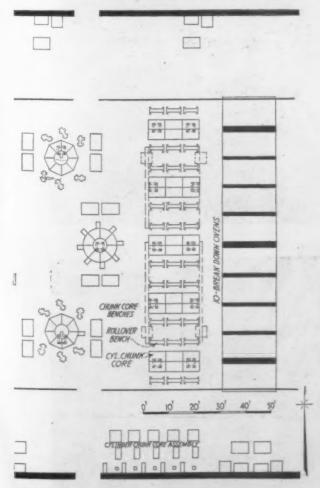
Adjoining the machine shop at the north is the shipping room, which contains a depressed track with room for eight cars, and has storage space for sufficient castings to load 1000 cars.

Service Building Includes Laboratory

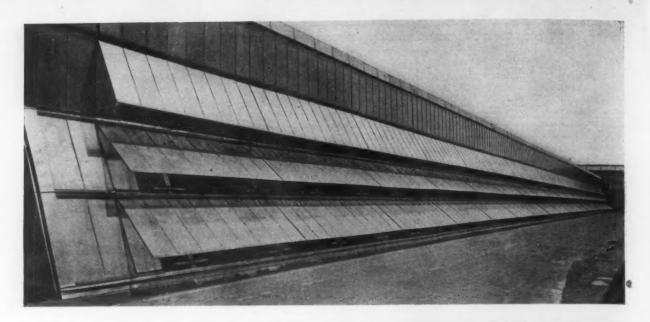
Extending from the shipping room the entire length of the north side of the plant as far as the material bay is the service building, a two-story reinforced concrete structure, 60 x 400 ft. On the first floor are located a stock room, 60 x 75 feet, equipped with Peerless hack saws, core wire straighteners and cutters and Durand steel lockers; a wood and metal pattern shop, 60 x 100 ft.; a pattern storage vault, 60 x 160 ft., with racks for small patterns; and a first aid hospital with complete equipment including foot tubs, eye foom, etc. On the second floor are separate wash rooms, locker rooms and shower baths for male and female employees, a cafeteria to accommodate 400 at one sitting, general offices and physical and chemical laboratories. A feature of the locker rooms is a fan system connected with the lockers which dries the sweat-laden clothes and through continuous circulation keeps the room free from odors. A feature of the laboratory lies in the fact that the physical, chemical and weighing departments are in separate rooms. The service building is heated with hot water coils, there being 8704 aq. ft. of direct radiation.

One Year in Building

The construction of the new Studebaker foundry was started Sept. 1, 1923, and the first heat was taken Aug. 27, 1924. For a time both this plant and the old Studebaker foundry will be operated; what final disposition will be made of the old plant is problematical, although it has been suggested that it be converted into a malleable and aluminum foundry. The new foundry building was designed by Albert Kahn, architect, Detroit, under the supervision of T. H. Libbey,



Ovens, the Core Assembly Stations and Other which the cores are handled on their way molds



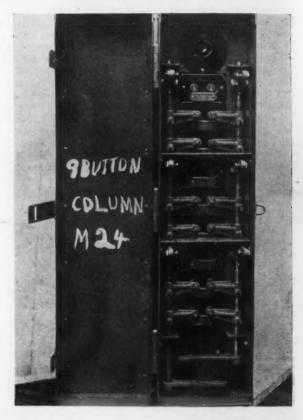
now superintendent of the plant. The H. G. Christman Co., South Bend, Ind., was the general contractor. The structural steel, 4500 tons, was fabricated and erected by McClintic-Marshall Co., Pittsburgh.

EXCELLENT Illumination and Ventilation Are Insured by Over 4½ Acres of Continuous Sash in the Monitors and Walls, or One Square Foot of Glass for Every Three Square Feet of Floor Space. Each run of windows is controlled by electrically-driven operators

The Longest Run of Sash, 600 Ft., Is in the Material Bay (Above). Each of the four runs shown is independently controlled, but they also may be operated simultaneously through a simple adjustment in the switch box

Switch Box Station (at Right) Controlling the Opening and Closing of Nine Runs of Sash. All of the runs may be operated simultaneously by setting lever arms on the vertical shafts to push nine buttons at once. By disengaging a given lever a run may be rendered inoperative. Individual operation of a run is effected by pushing its "open" or "close" button independently of the connecting lever. At top of switch box is a stop button which will stop all runs of sash that are in motion

Close View in an "A"-Frame Monitor (Below), Showing the Motor-Driven Operators Which Open and Close the Runs of Sash. Propulsion of the levers which lift and lower the windows is through chain and gear, visible on both sides in the foreground





Conveyor System in Aluminum Foundry

Some Unique Devices for Simplifying Transportation of Metal and Molds and for Lower-

ing Costs

ARKED developments in production methods have been made in gray iron foundries, equipped for continuous molding, through the installation of molding units with conveyors for handling metal, molds and flasks in large production work on motor castings, and the use of these has resulted in greatly reducing the amount of labor required and production costs as well as in considerable saving in foundry floor space. These methods of handling have been applied in the new aluminum foundry of the Wilson Foundry & Machine Co., Pontiac, Mich., which is equipped with an extensive monorail conveying system and a gravity conveyor system for handling molten metal, flasks and molds. Pouring is done on the gravity conveyor.

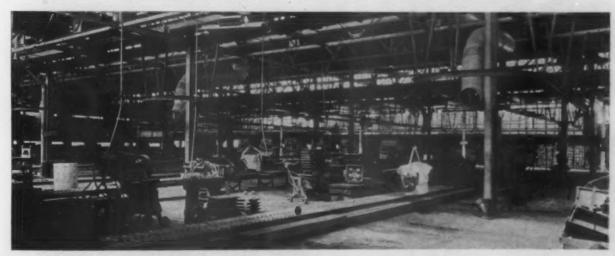
molds. Pouring is done on the gravity conveyor.

Two monorail tracks, in a parallel line 9 ft. apart, extend in front of the furnaces where the metal is poured into ladles of approximately 1000-lb. capacity. Branching off at right angles from these two conveyor tracks are five pouring loop tracks that extend back into the foundry 95 ft., these serving five molding and pouring units. These loops are 33 ft. 8 in. apart and each loop is 9 ft. wide at its widest point. Between each monorail loop is a gravity roller conveyor which loops around at the molding machine end of the unit.

On this gravity conveyor, which is located just above the floor, the molds and empty flasks are handled. The molding floor is located inside the two parallel sections of the gravity conveyor. Air hoists, attached to the monorail trolley, place the molds on this conveyor and they move along the conveyor to the pouring zone which is about 40 ft. in length.

At the pouring zone the overhead monorail is located in a parallel line with a gravity conveyor, the inside loop of the former adjoining the gravity conveyor. After pouring, the hoist carries the empty ladle around the other side of the loop and back over one of the main tracks that lead to the furnaces, and the flask moves to the end of the gravity conveyor where it is picked up by an air hoist to which is attached a Stoney shakeout bail. The mold is shaken out at the end of the gravity conveyor and the air hoist carries the flask a few feet to the return gravity conveyor that runs parallel to the gravity conveyor on the pouring side. When the flasks have reached the lower end of the return gravity conveyor, an air hoist carries them back to the molding machines.

The overhead conveying system was laid out by John T. Stoney of the Stoney Foundry Engineering



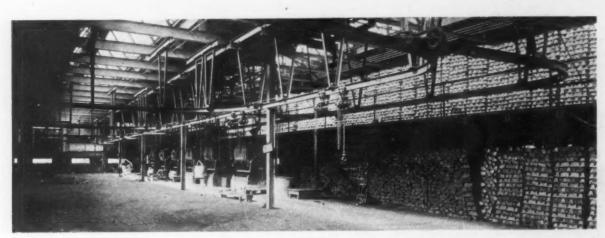
One of the Molding and Pouring Units with One of the Monorail Loops for Handling the Ladies at the Right. In the foreground is the gravity conveyor which carries the molds from the machines to the pouring zone and then to the shake-out. The return gravity conveyor is in the background



Another View of One of the Molding Units Showing the End of the Gravity Conveyor Where the Molds are Shaken Out and the End of the Return Conveyor on Which the Empty Flasks are Placed



The Cupolas in the Gray Iron Foundry Are Charged with an Electric Charger that Moves on a Monorall Track Connected to a Traveling Crane. The charge is placed in a circular steel bucket having a capacity of 3600 lb.



Two Monorail Tracks Pass in Front of the Melting Furnace and from these Five Monorail Loops Turn off at Right Angles for Carrying the Ladles of the Metal to Five Molding and Pouring Units

Equipment Co. and the system, including the trolleys and hoists, was built by the Chisholm-Moore Mfg. Co., Cleveland. The entire overhead handling system consists of approximately 1365 ft. of monorail track for handling hot metal and 625 ft. of track for handling the flasks between the gravity conveyors and molding machines together with numerous switches, curves, trolleys and hoist. The track system throughout is built of 5 in. I-beams. The trolleys and hoists are of ½-ton capacity. The hoists, which are of the Cyclone type, are operated by extended hand wheels. The trolleys, which are of the Matchless type, are equipped with Timken roller bearings.

An interesting feature of the conveyor installation is that the entire structure of the track system is supported by clamps and was erected without drilling any holes in the roof trusses. The superstructure is fastened to the roof trusses with malleable iron clamps and the hangers are clamped either to the superstructure or to the roof trusses. The monorail is clamped to the hangers so that the only tool required in the erection

of the track was a monkey wrench.

New equipment, recently installed in the gray iron foundry of the Wilson plant, includes two electric charging machines of an improved type built by the Chisholm-Moore Mfg. Co. Each of these machines serves a battery of three cupolas and takes the place of the former hand-charging method. The charging machine is of the cantilever type of construction and moves on the bottom flange of the monorail track suspended from an overhead, underhung electric traveling crane that spans the charging floor and has a 35-ft. runway in front of the three cupolas. Lack of more head room necessitated a crane to fit this space, the distance between the roof trusses and charging room floor being only 10 ft.

The charging machine has a cross travel on the monorail track of the crane and a hoisting motion for lifting and lowering the charging bucket, all electrically operated. The machine picks up the bucket and de-livers it inside the cupola. There are two hoisting drums, the main drum for carrying the load and an auxiliary for use in discharging the material from the bucket in the cupola. The charge is carried in a round steel bucket 5 ft. high and 36 in. in diameter and having a capacity of 3600 lb. The bucket has a cone-shaped bottom which carries the load. Suspended from the auxiliary drum is a yoke supporting dogs that engage a flange at the top of the bucket. The bucket is tripped by catching the flange by the dogs, stopping the auxiliary motor so that the shell is held stationary and then lowering the main hoist, permitting the bottom of the bucket to drop and the charge to pass into the cupola. The cone-shaped bottom distributes the charge uniformly. Each hoisting drum can be separately operated or the two can be operated in unison so that the material can be distributed at any desired elevation in the cupola.

The Ranson & Orr Co., Cincinnati, has been incorporated to carry on the business of dealer in pig iron, coal, coke, fluorspar and alloys. The company organized by William S. Ranson, for many years head the pig iron and alloys sales department of the Matthew Addy Co., and Delvin Orr, in charge of the coke department of the same company for some years. The company has opened offices at 819 Dixie Terminal Building.

Forty-Five Papers Before Steel Treaters

Notable Technical Sessions and Large Attendance at Sixth Anniversary of American Society for Steel Treating
—Steel Exposition Makes a New Record

AFTER five years of spectacular growth the American Society for Steel Treating celebrated its sixth anniversary in Boston last week, Sept. 22 to 26. In several respects the meeting made history. The technical sessions, ten in all, were marked by particularly high-grade contributions from leading American and foreign authorities and by the presence of more prominent metallurgists and scientists, including a number from abroad, than have been seen at a like meeting in recent years. The attendance of over 40 per cent of the Society's membership, or 1210 out of 3000, was also a testimony to the active interest in the organization, and there was general comment on the large turnout at all the technical sessions.

The steel exposition was the largest of the kind that has been held. Covering 150,000 sq. ft. of floor space, of which 25,000 sq. ft. was taken up by a representative machine tool and machinery display, it exceeded last year's in actual paid-for space by 33 1/3 per cent. It was the common observation that the exhibits of this year represented more new developments, both in machinery and heat-treating equipment and products, than had been seen at any previous show.

The exhibitors succeeded well in drawing visitors. Including the outside public, those who entered the building on the closing day numbered not far from 15,000.

The Technical Papers and Discussions

THERE were 10 technical sessions, five held in the forenoons in the ballroom of the Copley Plaza Hotel and five in the meeting room on the pier in the afternoons. There was a noticeable difference in the character of the morning and afternoon sessions. The former dealt with the more technical and theoretical phases of heat-treating problems; the latter embraced the more practical side, such as salt baths, hardness testing, heat treating furnaces and fuels, tool steel treatment and other general subjects. A marked feature of all the sessions was the large attendance coupled with lively interest. A drawback was the few papers preprinted, at least 60 per cent of the 45 papers or more scheduled being presented only in abstract. This prevented freer discussion. The society, however, has made progress in this, there being more papers ready in printed form than on former occasions. A feature was the contributions by foreign authorities, the total being ten, all presented by title except two.

The Morning Sessions

I N quality of subject matter and in the attendance and participation of noted foreign and American authorities, the morning sessions stand out in strong relief. Only the more important events can be chronicled in the following account of the leading papers and discussions.

Theoretical Metallurgy

The session which stood out prominently was that of Tuesday morning, Sept. 23. A feature of particular interest was an address by Prof. E. D. Campbell, the blind scientist of the University of Michigan.

X-Ray Analysis

Dr. Wheeler P. Davey, research laboratory General Electric Co., Schenectady, introduced his paper on "Application of X-Ray Crystal Analysis to Metallurgy" with a very clear description of the method whereby the arrangement of atoms in a crystal of metal is determined. By these methods it has been found that most ductile metals, like copper, silver, gold and aluminum have atoms placed as though they occupied the corners of a multitude of tiny cubes (stacked in regular rows, tiers and columns), with additional atoms at the center of each cube face. Such an arrangement in space is called a "face-centered cubic lattice." Relatively non-ductile metals, like chromium and tungsten, have the extra atoms at the geometric center of each cube—they have a "body-centered cubic lattice."

When metals are overstrained, slip occurs within the crystal, preferentially along planes of densest atomic packing. Each atom on such a plane in the ductile metals is symmetrically placed to six other atoms in adjoining planes—a close packing which allows change in position without breaking of internal bonds and loss of cohesion. Body centered cubic lattices have only two such anchors for each atom on the slip planes, and hence are more brittle.

A practical application of this knowledge is the production of ductile chromium. Pure chromium has only moderate ductility, but traces of impurities cause it to crystallize in the face-centered cubic lattice, with great increase in ductility.

The X-ray is also able to throw some light on the nature of solid solutions. Atoms in such alloys appear to have different volumes—that is, to be spaced at different distances, center to center—than in either constituent metal. The same atomic distortions exist in chemical salts, and the deduction follows that in true solid solutions, atoms of the solute are ionized.

This fact indicates a striking similarity to aqueous solutions. Prof. E. D. Campbell, of University of Michigan, has been studying steel from this viewpoint for nearly 30 years. Many of his results can be best explained by assuming that hot steel is a true solution of carbon in iron—in the same sense of the word that a pinch of salt dropped in a cup of water forms a solution.

Professor Campbell, in introducing his paper on "Steel Bars Differing only in Carbon Content," took occasion to review briefly the line of experimentation he has been following for so long. Despite the almost insurmountable handicap of total blindness, he has achieved results which place him at the front of living physical metallurgists. His striking address was the feature of the session, and received an enthusiastic ovation.

A further extension of the use of X-ray analysis to metallography was given by K. Heindlhofer and

F. L. Wright, of the SKF Laboratories, Philadelphia, in their paper "Density and X-Ray Spectrum of Hardened Ball Steel Drawn at Various Temperatures." It had been previously observed that as austenite transforms into martensite the system of waves reflected from the atomic planes in the face-centered lattice of gamma-iron fades into the body centered alpha-iron. These authors propose to measure the intensity of certain typical beams accurately by passing them into ionization chambers and observing the electrical indications. By this means they find that a hardened steel drawn at 200 deg. C. which showed small patches of austenite in martensite needles had a definite peak in the X-ray spectrum at 200 Kα. After a draw at 260 deg. C., these austenitic patches disappeared with a corresponding suppression of the X-ray line.

To determine whether this austenite transformed into martensite or into pearlite, the authors made several other experiments. A slight shift in the location

of the X-ray line suggested the reaction.

austenite → martensite

Again since austenite and pearlite have nearly the same density an austenite → pearlite change would involve no change in volume. As a matter of fact, tempering this hardened steel at 270 deg. C. lowers the density, as it should. Furthermore, a series of Rockwell tests show that a softer substance is transformed into a harder one.

All these facts lead the authors to the conclusion that austenite in hardened steel changes to martensite at low temperings, and that residual austenite can be discovered by X-ray tests when it is present to no more than 3 per cent by volume, and invisible under the

microscope.

Haakon Styri, director of the SKF laboratory, in discussing these papers, outlined what he thought to be the sequence of changes in tempering hardened steel. If one had a pure austenite on quenching, a mild tempering forms some alpha iron on cleavages and grain boundaries. The carbide precipitated is thereupon somewhat concentrated, but is prevented from crystallizing to cementite by an excess of iron. Hardened steel, therefore, has a very distorted crystal arrangement, both in the iron and the carbide. Furthermore, any untransformed gamma iron is a highly supercooled solution of carbide, and therefore also under great strain. More strains are imposed by the volume changes associated with the change of face-centered to body centered lattice.

Further changes on mild tempering are indicated by the X-ray spectrometer to represent a more orderly building-up of the alpha lattice, and are associated with a more definite martensitic microstructure. All these hardened steels exist before the magnetic test is able to distinguish any free cementite. Consequently, Dr. Styri concludes that it is unreasonable to assume that cementite is the only explanation of hardness. Derangement of atoms from their normal crystalline posi-

tions is the prime factor of hardening.

High Power Metallography

"The Microstructure of Austenite and Martensite" was described by F. F. Lucas, of the Western Electric Co., New York. Mr. Lucas had been awarded the Howe medal for his paper on high power metallography published during the year past, and the present paper was a most worthy successor, even though described by the author as "merely a progress report."

A large number of notably fine micrographs were shown of a synthetic alloy of Armco iron and 2.65 per cent carbon. It had been forged, one end heated and then quenched like a Metcalf test. At various places along the rod, were areas showing pure austenite grains with eutectic material cementing them, and many stages of decomposition of these substances. The micrographs, therefore, showed martensite and troostite in various stages of development.

It is impossible to give much of an idea of the findings without reproducing many of the photomicrographs. However, Mr. Lucas has been able to develop cubical etching pits in austenite. He also believes that troostite and martensite develop preferentially along octahedral cleavage planes in the austenite crystal. As Dr. Davey pointed out, these observations verify exactly the X-ray data indicating that the atoms are arranged in face-centered cubes.

Martensite needles ("feathers" would be a better term) at high power appear to have a deeply etching straight central rib—thought to be troostite. The balance of the feather is often seen to have a fine granular texture, or to be finely striated like pearlite (and in fact have a pearly luster), or to be crossed by a large number of twinning bands arranged in one or two directions. The ultimate grain of martensite is exceedingly fine, because rotation of the specimen does not change the tone or intensity of reflected light.

It may be remarked in comment that these actual observations also confirm X-ray deductions that the ultimate grain size of martensite must be verging on ultra-microscopic, despite its ordinarily observed appearance of a mass of interlocked needles.

Speroidized Cementite

"Speroidized Cementite in Hypoeutectoid Steel" by R. S. MacPherran and J. Fletcher Harper, Allis-Chalmers Co., Milwaukee, was presented in abstract by Mr. Harper. It was available in preprinted form.

More Theoretical Metallurgy

The third morning session was another contribution to theoretical metallurgy.

Tool Steel, Electric and Crucible

Dr. John A. Mathews, of the Crucible Steel Co. of America, New York, read a comprehensive discussion of the "Making and Use of Tool and Special Alloy Steels." Only a few of its salient points can be presented here.

He thinks that crucible steel has an inherent advantage over the electric furnace product because it is in the long run safer to start with good materials carefully selected at leisure than to attempt to refine lower grade constituents rapidly in the furnace. Then, also, the electric furnace is too often operated by men whose previous experience has been almost exclusively with open-hearth steels. The production of fine steels will always be far removed from "tonnage" operations, but some producers never seem to learn that fact.

This fact is most apparent in high-speed steels. There is a disproportionate amount of interest and effort spent on it to justify the moderate amount of it sold. Dr. Mathews said that one of his company's plants could easily turn out more than the entire American consumption. Under these circumstances high-speed steel often becomes a nuisance rather than a source of profit to its producer. This is a regrettable state of affairs, in view of the enormous volume this material has been to all metal working industries.

Since high-speed steel is an alloy of nine elements, some of which exist in more than one form of compound, the complexity of the material is evident. Furthermore, it is used, after proper heat treatment, for such a wide variety of uses and on such a wide variety of metal, that a general specification (especially if based on chemical analysis) would appear to be unworkable. This is especially true in view of the fact that the thermal and mechanical history of the tool is much more important than a small variation in chemical composition in determining the cutting ability.

tion in determining the cutting ability.

Early in his experience Dr. Mathews became convinced that uniform conditions were necessary to secure uniform results, either in laboratory or in factory, but when the variables were controlled, a satisfactory result ensued. He therefore enumerated the principal variables in steel as follows:

Chemical composition
Method of manufacture
Manufacturing anneal
Quenching temperature
Time at heat
Time and temperature of draw

Under these circumstances it would be unwise for purchasers to place too much confidence in a specification closely controlling any one of these items, with a corresponding disregard for the others.

Transformations in Pure Iron

The eminent Japanese metallurgist, Dr. Kotaro Honda, director of the Iron and Steel Institute of Japan, read a paper on the above subject. It followed closely the address he has given in several cities during his American tour.

According to his ideas a "transformation" takes place in a body when some property of that body changes, even though the temperature remains constant. At that temperature the given property—such as specific gravity—may have two distinct values. Thus, melting of ice at 0 deg. C. is a transformation; the continuous change of length of a platinum bar as the temperature rises is not an evidence of a transformation.

Following these ideas, Dr. Honda deduces that the A₂ point—formerly thought to represent the transition of alpha to beta iron on heating—is not a true transformation. At least the evidence of electrical resistance and magnetization points in this direction. If the temperature is held fixed at A₂, no change in these properties occurs. As the temperature falls, a rapid change may be measured, but each temperature is associated with a specific volume for electrical resistance or magnetization. Therefore A₂ appears to be merely the point where certain latent properties become developed to a point where they may be observed easily.

From these ideas, and the evidence of X-ray crystal analysis, Prof. Honda thinks that the older thesis, that iron possesses four modifications, viz., alpha, beta, gamma and delta, should be revised to read alpha \rightarrow gamma \rightarrow alpha with increasing temperature, corresponding to the body-centered and face-centered cubic lattice found at those respective temperature ranges.

High-Speed Steels and Other Subjects

The technical phase of the first morning's session, that of Monday, Sept. 22, embraced high-speed steel and magnetic analysis. The first part of this session was taken up by the usual preliminary addresses of welcome, with responses, details of which were published in The Iron Age, Sept. 25.

Chromium in High-Speed Steel

With Dr. George K. Burgess, director of the Bureau of Standards and president of the society in the chair, Dr. E. C. Bain delivered an abstract of a paper written by himself and M. A. Grossman, Atlas Steel Corporation, Dunkirk, N. Y., on "The Nature of the Function of Chromium in High-Speed Steel." The speaker attempted to illustrate the presentation of his abstract by photomicrographs thrown on the screen, but this was only partially successful, because of the difficulty in shutting off daylight. However, Dr. Bain attempted to answer the question of why chromium is put in highspeed steel by an investigation which was based on the proposition of leaving it out to find an answer to the In other words, a series of steels was made in which the varying constituent was chromium. In the first steel 0.25 per cent chromium was present, in the second 0.61 per cent, in the third 2.10 per cent and in the fourth 3.85 per cent, which approximates the standard. Three principal properties were investigated: Change in hardness after heat treatment; change in dimensions or volume; changes in impact strength and toughness.

Among the conclusions of the authors, the paper not being reprinted, were the following:

Chromium increases both the hardness and toughness under the conditions investigated.

Chromium lessens the sharp concentration gradients

throughout the steel.

Its presence produces greater uniformity in the impact strength.

Tungsten, without chromium, has an effect upon the secondary hardness, but chromium facilitates the solution and reduces the oxidation and scaling during heat treatment.

Doctor Bain said that it could be easily concluded

from the photomicrographs that the kneading action was a very important and beneficial factor.

Magnetic Analysis and Elastic State

The paper on magnetic analysis was entitled "Magnetic Determination of the Elastic State," by A. V. deForest, American Chain Co., Bridgeport, Conn. In the absence of a printed paper, the author said that there was a definite relation between elastic limit and fatigue strength of a metal; if one knew just what elastic limit really is. He alluded to some of the work of Professor Jenkins and stated that there was a close relationship between stress and magnetic properties. As a simple illustration of this fact, he used the familiar phenomenon of the effect of a rod of iron on an ordinary compass, supplemented by the radical change in this effect if the rod is subjected to a sudden blow. It was the author's conviction that under certain favorable and definite conditions, it was possible to establish a magnetic determination of the elastic state of a metal.

Two papers of foreign origin were offered by title at this session. One was by Doctors W. Oertel and F. Poelzgueter, Germany, entitled "The Use of Cobalt and Vanadium as Additions to High-Speed Steel." The other was entitled "The Law of Depression of Freezing Point as Applied to Metallic Alloys" by Drs. Kotaro Honda and Toyato Ishigaki, Imperial University, Japan. The chairman called upon Dr. Honda to stand up, but his formal appearance before the society came on Wednesday morning when he presented a paper which was scheduled for discussion.

Steel Castings, Carbon Steels and Other Papers

Five papers scheduled for the Thursday morning session, with Dr. Albert Sauveur, Harvard University, in the chair, included "Quenching Diagrams for Carbon Steels in Relation to Some Quenching Media for Heat Treatment," by H. J. French and O. Z. Klopsch, Bureau of Standards, Washington; "A New Theory of Overstrain and Strength of Materials," by H. P.Troendly and G. V. Pickwell, William D. Gibson Co.; "X-Ray Tests Applied to the Problems of the Steel Foundry," by Dr. H. H. Lester, Watertown Arsenal, Watertown, Mass.; "Influence of the Structure 'as cast' upon the Manufacture and Qualities of Some Alloyed, Especially High-Speed Steels," by Dr. Franz Rapatz, Duesseldorf, Germany (By title); and "Correlation of Endurance Properties of Metals," by Dr. D. J. McAdam, Jr., United States Naval Experimental Station, Annapolis, Md.

Quenching Diagrams for Carbon Steels

This paper relates to "quenching diagrams" for carbon steels containing from 0.25 to 1.25 per cent carbon. In these are shown the relations between Rockwell hardness, microstructure, thermal transformations and the cooling velocity determined at 720 deg. Cent. (1328 deg. Fahr.). A discussion is given covering the general relations between the quenching diagrams and various quenching media for heat treatment, such as water at different temperatures, oils, sulphuric acid solutions of various concentrations, brines and sodium hydroxide solutions. This paper was preprinted.

Discussion

In discussing the paper read by Mr. French it was pointed out that it is unwise to draw hasty conclusions as to the workability of a steel, merely from its hardness number. Some steel tools cut well with a hardness of No. 65 Rockwell, while others at 70 or 75 will not. Of course, the same story holds true of the Brinell test.

Hugh Rodman called attention to the fact that non-oxidizing alloys give cooling curves quite different from those of steel. Silver-nickel alloys, for instance, give a certain set of results in certain oil baths, while steel in those same baths shows a marked change in the rate of cooling. This difference seems to depend, in some measure, upon the surface of the steel and also upon the character of the alloy used in comparison. A perfectly clean steel will not cool so readily as a slightly oxidized steel, but when an appreciable scale has been formed on the steel it cools very rapidly.



Dr. Kotaro Honda

D. R. KOTARO HONDA and Fred C. A. H. Lantsberry were two of the foreign metallurgists contributing to the technical programs.

Dr. Honda is the most distinguished metallurgist of Japan. He is director of the department of metallurgy, Japanese Imperial University, and head of an imperial metallurgical institute. With other Japanese scientists he has spent several months in this country and England.

Mr. Lantsberry is managing director of William Jessop & Sons, Ltd., Sheffield, England, and is here on a brief business trip.



F. C. A. H. Lantsberry

These observations were made from tests of weighed steel specimens of known specific heat capacity cooled in a weighed quantity of oil, also of known heat capacity. The measure of rise in temperature of the oil was taken as the indication of the heat loss of the steel sample.

New Theory on Overstrain and Strength

In this paper are cited much old data and new evidence in an outline and connected form, which places the phenomena of overstrain in a fascinating mechanical light. The authors have evolved a new theory on the mechanics of overstrain and strength of materials, which might be termed the plastic transfer of the proportional elastic range. They conclude from the evidence which they review and the new data they submit that any strengthening, as a result of cold work, is not through the formation of a hard amorphous material which renders the section deformed of higher elementary unit-strength, but that the increase in strength in any direction is at the expense of the strength in the opposing direction. Also, it is argued, the increase in strength in the direction of overstrain is through a mechanism of slip, whereby more of the elementary areas or units are allowed to slip into position to assume higher stress in the direction of overstrain. This was also available in printed form.

Discussion

In discussing the paper of Mr. Troendly and Mr. Pickwell, Dr. Ancel St. John referred to his X-ray tests on cold rolled aluminum 0.002 in. thick, in which he found planes normal to both the surface and the direction of rolling and all thus parallel to each other. These gave clear reflections at 3 ft. distance. But reflections of planes parallel to the direction of rolling were exceedingly weak.

Another speaker drew attention to the fact that the theoretical aspects of this matter of overstrain are so involved as to make it impossible, with the time available, to go into them. Iron and steel show more variation in their distortion than do other metals, while being our most important engineering materials.

Not sufficient attention has been called to the effect of time on heating and cooling. A bar tested at once after being distorted shows an elastic limit of practically zero. But that same bar, if allowed to rest for two weeks, or if reheated, recovers elastic limit. Cold work on steel very generally increases the hardness and actually does increase the elastic range, if the tests are made after aging or heating.

Two wires thrown on the screen were used to illustrate the theorem that any material which shows a yield point ordinarily shows also a softening point just beyond it. One of these wires, in torsion, gave indications of the juncture between a section of considerable twist and one of much less twist. This junc-

ture is the soft spot. The other wire, which had been annealed, showed no such division but was uniform in characteristics.

Overcoming Defects in Steel Castings

Dr. Lester's paper, delivered extemporaneously, with lantern slides, covered a wide range of flaws in steel castings, with a study of their causes and suggestions for remedies. The X-ray method of testing was largely in the background. In substance and abstract he said:

We are demanding greater and greater metal efficiency and greater strength is asked from steel. As a matter of fact, we are not getting their ultimate efficiency from the steels which we have.

Defects cast in steel, including segregations, blowholes, cracks, etc., cause extra metal to be used in many important places, to be sure of having enough good material to provide the needed strength. This is especially true of fire pumps, where a defective cylinder may mean a \$1,000,000 fire—a chance which cannot be taken. Automobile makers would use cast steel in place of forged steel if they could depend upon it, and the same holds true of malleable iron. We need methods to overcome definitely the defects in cast steel.

Greater care must be used in blowing out and closing molds. Grit, collecting in the mold at spots where there is little flow toward the riser, is caught up by the metal in process of stiffening, before it has an opportunity to get out. It thus is important to have a good flow of metal from the gate to the riser.

In one foundry, where it was found customary to schedule the heats on a timetable basis, whether the metal was ready for pouring or not, the steel often was boiling in the ladle, when pouring. Scrapings from blowholes formed showed 93 per cent FeO.

In some cases, where black oxide shows up in cavities, this is due to steam from a damp mold, caused by improper venting. Green cores always give this trouble, but green molds do not, when properly vented.

Wear of a piece in service, if the surface contains included sand in holes, often causes the sand to drop out, leaving pits.

Internal cavities are not so easy to dispose of as some of the other flaws already discussed. They are due, usually, to the fact that the metal takes less volume when solid than when liquid; the skin usually chills first and, after it is formed, metal is pulled away from it and this shrinking cavity results in a pipe. In some cases the riser feeds into this pipe and fills it. But a riser which is nicked at the base, to facilitate knocking it off, might as well not be used, for it freezes at the neck and then can not feed into the place where the steel may be needed.

Some cavities show the presence of dendrite on both sides, indicating that the cavity is a direct break in the metal. X-ray examination is useful for showing



Dr. S. W. Stratton

DR. S. W. STRATTON, president Massachusetts Institute of Technology, and formerly head of the Bureau of Standards, was one of the honorary committee of arrangements for the convention and exhibition. The others were Governor C. H. Cox of Massachusetts and Mayor James M. Curley of Boston.

A. O. Fulton, president Wheelock, Lovejoy & Co., Boston, and member of the Boston Chapter of the Society, was chairman of the general committee on arrangements.



A. O. Fulton

cracks which do not appear on the surface and is employed to locate them.

In conclusion, the great majority of defects in steel castings may be eliminated—perhaps as high as 85 to 90 per cent—by exercising proper care. Fortunately, once a correct analysis has been made and the trouble overcome, it stays overcome, though sometimes not without a change in the design of the part affected.

Endurance Properties of Metals

Space does not permit a description of the valuable paper by Dr. D. J. McAdam, Jr. It was preprinted in the September issue of the society's *Transactions*.

Stainless Steel and Other Subjects

Seven papers were scheduled for the session Friday morning, with Dr. Zay Jeffries, Aluminum Co. of America, Cleveland, in the chair. Of the list which follows, the paper by Mr. Parmiter was not given, due to his absence. The papers were "Stainless Iron and Steel," by T. Holland Nelson, United Alloy Steel Corporation; "Stainless Steel and Stainless Iron," by O. K. Parmiter, Firth-Sterling Steel Co.; "Tensile Properties of Some Steel Wire at Liquid Air Temperatures," by W. P. Sykes, National Lamp Works of General Electric Co.; "Grain Boundaries in Steel," by Cecil H. Desch, England (by title); "Macroscopic Examination of Steel," by V. O. Homerberg, Massachusetts Institute of Technology, Cambridge; "Secondary Crystallization in Iron-Carbon Alloys," by Dr. Vsevolod N. Krivobok, Carnegie Institute of Technology, Pittsburgh; "Quenching Properties of Gylcerin and Its Water Solutions," by Howard Scott, Bureau of Standards, Washington.

Tensile Properties of Some Steel Wires at Liquid Air Temperatures

In this paper the author has compared the tensile properties of three types of steels, low-carbon, nickel and chrome-molybdenum, as measured at room temperature and the temperature of liquid air (about—180 deg. Cent. [—292 deg. Fahr.]). The steels, in wire form, were tested in tension as annealed, as water quenched, and as quenched and tempered at four temperatures between 300 deg. Cent. (572 deg. Fahr.) and 700 deg. Cent. (1292 deg. Fahr.).

Values for tensile strength, elongation and reduction of area of three steels at 25 deg. Cent. (77 deg. Fahr.) and—180 deg. Cent. are given in tables in the paper.

Macroscopic Examination of Steel

This paper explains the manner in which segregation takes place in steel. The method of preparing the specimens, the formulas of the etching reagents, together with directions for their use and the necessary precautions to be taken, are given. Macrographs are included to illustrate the results obtained from the use of these different reagents.

Two of the methods for manufacturing gears were shown on the screen, one being the flat-bar method, in which the blow of the hammer is perpendicular to the direction of the fiber. A tooth cut in such a blank at the ends of one of its diameters will have the fiber perpendicular to the pitch line of the tooth and the direction of the fiber will be such that the direction of the stress applied to the tooth will be perpendicular to the fiber. A tooth cut at the ends of a diameter at right angle to the first will have the fiber parallel to the pitch line and to the direction of the applied stress and will be greatly inferior in its shock-resisting properties.

Stainless Steel and Stainless Iron

This paper reviews the history and development of stainless steel and stainless iron of the 13 per cent chromium type. The author discusses the problems involved in the manufacture of this material, its composition and the effect of various elements upon it. The heat treatment, forging, normalizing, annealing and hardening are covered in detail. Many of the physical properties of this material are reviewed, such as heat resistance, tensile properties, corrosion resistance, resistance to acids, solutions and gases.

He has covered in some detail the general properties of stainless steel, including the brazing and welding, cold drawing and cold rolling, its cutting properties, electrical conductivity and resistivity, magnetic properties, machining qualities, microstructure and thermal conductivity. A brief discussion of stainless iron and its applications and possibilities are included.

The Afternoon Sessions

THE five afternoon sessions in the meeting room at the exposition were not held under the most idealistic conditions. The lighting was bad and there was considerable noise, but despite this they were successful, helpful and well attended. A report of the leading features of each session follows:

Symposium on Hardness

The third annual symposium on hardness, held Thursday afternoon, was unusually interesting and profitable. Dr. H. P. Hollnagel, General Electric Co., Lynn, Mass., was chairman.

Relation Between Brinell and Rockwell Scales

One of the most interesting papers among the five contributions was one entitled "The Relation Between Rockwell and Brinell Hardness Scales," by Prof. Irving H. Cowdrey, Massachusetts Institute of Technology, Boston. An abstract of the paper, which was not preprinted, was presented by the author. He started out by saying that the question of the proper relation between the two methods of hardness testing had been a topic of contention for some time and that, some two years ago, researches on this subject had been the topic of two theses at the technology institute,

based upon a large number of tests of about 300 pieces of different materials, ranging from lead to stellite and having a Brinell hardness range up to 800. From these tests the authors have succeeded in plotting a curve upon which there has been based formulas for comparing Rockwell readings with Brinell. Professor Cowdrey presented these formulas, the one for a Rockwell machine having a 1/16 in. ball, being as follows:

$$R_{16} = \frac{Br - 42}{0.154 + 0.0074 Br.}$$

When the diamond cone is used in the Rockwell machine, the corresponding formula is as follows:

$$R_c = 88.3B^{0.161} - 192$$

The other formula presented by the author, designed to show the relation between the two Rockwell methods of impression, is as follows:

$$R_{16} = \frac{R_c + 35}{0.47 + 0.0048 R_c}$$

While these formulas are not offered as final, several thousand tests indicate that they can be relied upon. They are, however, all empirical.

An interesting portion of this same paper was an exposition of a comparison of hardness testing by the two methods on large grains of brass, in which the authors showed that by the Rockwell machine the hardness of various portions of grain was distinguishable, whereas the Brinell test gave only an average hardness over the same surface.

Hardness and Impact Values

The results of a series of tests on some 80 pieces of high-speed steel, with the object of determining the relation, after certain heat treatment, between the hardness and impact values were presented in a paper by G. W. Webster, Bellis Heat Treating Co., New Haven, Conn. Comparisons were made between quenching from a high bath temperature into a salt at around 1100 to 1150 deg. Fahr., and quenching from the same medium into oil direct, with both Rockwell hardness and Charpy test results on these pieces compared.

The author stated that the paper was largely a report on work in progress, and among the conclusions he stated that, as to impact quenching in salt as compared with quenching in oil, the former increased the toughness on the average of about 50 per cent, and also that quenching at about 1150 deg. in salt produced a greater toughness than when quenching in oil direct. As to hardness, they had found thus far that quenching from 2275 deg. Fahr. into salt at 1150 deg. resulted in extreme hardness, even harder than when quenching in oil.

Brinell and Rockwell Hardness of High-Speed Steel

The comparison of "Brinell and Rockwell Hardness of Hardened High-Speed Steel" was the subject of a paper by S. C. Spalding, Halcomb Steel Co., Syracuse, N. Y. The steels used averaged 0.49, 0.57, 0.69 and 0.74 per cent carbon. Some of the results were shown by throwing charts upon the screen. One conclusion of the author was that the secondary Rockwell hardness was less than the initial in most cases after the employment of a definite heat treatment, whereas in the case of the Brinell hardness the secondary value was often equalled to the initial hardness, but never greater.

An elaborate paper, the only one preprinted, was a discussion of the "Ball Indentation Hardness Test," by Dr. Samuel L. Hoyt, General Electric Co., Schenectady, N. Y. It is largely a discussion of the results of an extensive investigation of Brinell's ball indentation hardness test made in 1908 by Prof. Eugen Meyer of the Materials Testing Laboratory, Imperial School of Technology, Charlottenburg. In this early investigation it was shown that the hardness of a metal cannot truly be represented by one figure, or to express it in another way, the resistance to penetration varies with the degree of penetration of the bath. Doctor Hoyt, in his paper, discusses somewhat at length the results of Professor Meyer in order to throw light on our own present methods of testing hardness.

Major A. E. Bellis, Bellis Heat Treating Co., presented a report on the hardness testing work of the A. S. M. E. committee on cutting metals, based partly

on the work of Professor Keller of the Pennsylvania State College.

Discussions

The discussion of these papers, which followed their presentation, brought out several points of interest. A. H. d'Arcambal, Pratt & Whitney Co., Hartford, Conn., in discussing Mr. Webster's contribution, said that it would be interesting to apply the same investigation so as to compare the results, which might be obtained, by initial open fire heating at the same temperatures, and also the use of a lead bath, with the results already reported upon. He offered the services of his laboratory for such an investigation. The same speaker, in discussing one of the other papers, made the statement that of four different hardness testing machines applied to hardened material in his own hardening room, he had found the Rockwell the most satisfactory.

W. S. Rockwell, inventor of the Rockwell machine, referring to Professor Cowdrey's allusion to large grains of brass, stated that in a steel containing 0.04 per cent carbon heated to a high temperature and decarburized and then tested with a Rockwell machine using a 1/16-in. ball, the impression when photographed showed 20 crystal faces.

Symposium on Salt Baths

The society's second symposium on "Salt Baths as Heating Media," the first having been held at the meeting last year in Pittsburgh, was the subject of the session Monday afternoon, Sept. 22, at which A. H. d'Arcambal, Pratt & Whitney Co., Hartford, Conn., presided. Three authorities presented their views in three papers at this session, only one of which was available in printed form.

Heat Treatment in Salt Baths

The subject was introduced by Major A. E. Bellis, Bellis Heat Treating Co., New Haven, Conn., who gave an abstract of his paper entitled "Heat Treatment in Salt Baths." Prefacing his remarks that among the chief aims in heat-treating processes was the securing of uniformity, reproducibility, certain temperatures at certain periods, and the avoidance of oxidation, he contended that liquids were the best means to these ends, and the question naturally was as to what liquid should be used and what should be its properties. Such liquids, he said, should be neutral to steel, stable, and not capable of deterioration, and that they also should have fluidity, as well as properties protective to the metal. He did not regard ordinary barium chloride salts as stable or neutral and, in his opinion, cyanide and lead baths are subject to certain objections.

In his general discussion of the subject he gave several unique examples of the application of salt baths to various special metal products and said among other things that the baths which are used should be able to maintain the surface luster of the piece treated and that, in the case of twist drills, there should not be a too rapid initial heating.

Major Bellis contended that from the point of view of the steel treater, salt baths furnish liquid heating media which have properties which may be summarized under 14 points. These 14 points cannot be restated here, but the author recounted installations, illustrating specific instances of each of the 14 points mentioned, and some of these were elaborated by drawings and other reproductions thrown on the screen. The paper was, of course, an argument supporting certain special combinations of salt, which he has perfected and which he offers under trade names.

Salt Baths of Various Kinds

The presentation of this paper was followed by one by Sam Tour, metallurgist Doehler Die Casting Co., Batavia, N. Y., entitled "Salt Baths." The author gives the results of his practical experience in his own experimental and development work in connection with such baths. Various reasons for employing liquid heating medias are given, as is also the design of furnaces for the proper melting of salt baths. There is also given in detail a diagrammatic outline to meet the requirements discussed. The author also presents a de-

tailed consideration of containers for such baths, as well as tables of the composition of various salt mixtures. The use of salt baths for the heat treatment of carbon tool, alloy tool and high-speed steels is also elaborated upon, pointing out at the same time the qualities of the various baths which had been observed.

Fused Salt Baths and Soft Spots

"Fused Salt Baths for the Prevention of Soft Spots in Quenched High Carbon and Carburized Steels" discussed by the third authority, W. J. Merten, metallurgical engineer Westinghouse Electric & Mfg. Co., Pittsburgh. From the data obtained and presented by the author, the following conclusions were reached:

1. Uniform and extreme surface hardness of high carbon and carburized steel depends upon uniform and accelerated abstraction of heat.

2. Vapor and salt films are poor conductors of heat and, wherever present, prevent drastic cooling and consequently result in irregular hardness of the steel article at points where these films occur.

Ordinary quenching liquids do not dissolve these salt films and seem to promote rather than prevent formation of gas films at the surface of the steel under

treatment.

4. The quenching medium of the composition given in the preceding pages does solve the problem of uni-formly producing full hard steels when heated for hardening in fused salt baths, the resultant structure

being entirely martensitic.

5. When a fused salt bath employed for heating is purified by a mixture of boracic acid (BOa) and charcoal (C) and this purification maintained by small additions of this scavenger mixture from time to time, high carbon tool steel will not decarbonize, neither will carburized steel be pitted nor will other objection-

able surface conditions prevail.
6. The containers mentioned and successfully employed for this salt bath heating suggest a definite line of development for containers and seem to indicate that low carbon steel plates properly coated with high heat resistance alloys of an aluminum base would service satisfactorily for this class of heating of steel

and would find a ready market.
7. In concluding the author wishes to express the hope that he will be able to present in the near future an equally satisfactory unit for the heating and quenching for hardening of high-speed tool steels.

fairly spirited running discussion, consisting largely of frequent questions and answers, characterized the closing part of this session, following the presentation of the three papers. It was participated in by Dr. Zay Jeffries, Aluminum Co. of America, Cleveland; by the chairman, Mr. d'Arcambal; by H. C. Knerr, metallurgist Naval Aircraft Factory, Philadelphia; L. Seidel, president New York Testing Laboratory, New York, besides the three authors of the papers.

Fuels for Heat Treating

The session on fuels for heat treating was held Tuesday afternoon with Prof. H. M. Boylston, professor of metallurgy Case School of Applied Science, Cleveland, in the chair. Three papers representing advocates of electricity as a fuel and gas and oil as fuels were presented, but a number of them were not in preprinted form. Each author presented a fairly full abstract,

Electric Furnaces for Heat Treating

The general subject was introduced by E. F. Collins, General Electric Co., Schenectady, N. Y., with a paper entitled "The Intrinsic Value of Heat Sources versus the Floating Economic Value of the B.t.u." The author's paper is an elaborate comparison of various fuels based largely on B.t.u. values and also a discussion of The advantage the economic value of different fuels. of electricity as a heating medium, despite its initial cost, was one of the main contentions of the author, although there are exceptions, in his opinion, to this general statement, there being cases where some other fuel has the advantage. Comparing electricity with fuel oil, Mr. Collins contended that there has been an increase in the cost of oil as fuel and he cited statistics for 1921 which showed that of the 312,000,000 bbl. of fuel oil used as fuel in that year, 25 per cent was wasted by inefficient combustion. He also cited a case which, as reported to him, showed that whereas gas had been able to heat treat only 1600 small pieces of

metal in a given time, electricity as a fuel has accomplished the heat treatment of 9600 pieces in the same

In general he contended that electricity was an important factor in the general problem of conservation and that the highest over-all economy demands electric heat rather than any fuel that may have a low B.t.u. He admitted that this might not be true in all localities, but that it will become more and more true for all sections as time goes on.

Selection of a Fuel

"The Selection of Fuel for the Heat Treatment of Metal" was the subject of the paper by J. A. Doyle, W. S. Rockwell Co., New York, which in the absence of the author was presented in abstract by J. N. Voltman. According to the author, the value of any fuel is measured by the over-all cost of the finished product and the aim in the selection of the fuel is to secure one which will produce a quality product at a low cost. Abstract comparisons of various fuels are inaccurate and misleading. Without question every fuel, whether electricity, gas or oil, has its field of usefulness. At present the situation is confusing and the claims made by the advocates of different fuels vary decidedly.

Gas as a Fuel

Advocates of gas were represented by a paper by H. N. Lobell, Combustion Utilities Corporation, New York, who briefly abstracted his paper entitled "Gas as a Factor in Improving Quality Standards and Lowering Production Costs of Heat-Treated Steel." The author's presentation was largely one of comment, partly on the general subject and partly on the papers already pre-

He suggested that the officers of the steel treaters' organization put before the various advocates of fuel their heat-treating problems and their solution which would involve a test of the comparative values of the different fuels on the heat treatment of some special steel or group of steels. He contended that today's problem is the production of the highest quality material at the lowest cost. The improvement of the gas furnace by the use of the recuperators, which insure combustion with practically no excess of air, has introduced an important factor. Mr. Lobell did admit that the heat-treating industry was under something of a handicap because gas companies in some localities were not using every means to improve their product. He believed, however, that this improvement was being carried out more and more. Among fundamentals in the problem of fuels for heat-treating the speaker mentioned quality at a low cost and the economic preparation of fuels.

Discussion

In the discussion, H. E. Scarborough of the General Electric Co., stated that in a comparative test on a heattreating problem of electricity with gas in furnaces side by side, electricity had shown a cost 20 per cent less than that of gas. Another speaker said that he had found there was not much difference in cost of fuel on a quality product, disregarding the original costs of installment which, in many cases, were close to each

R. J. Phelon, Worcester Gas & Electric Co., Worcester, Mass., stated that Mr. Collins' reference to the difference in the heat treatment of 1600 small pieces compared with 9600 was to his knowledge incorrect. Mr. Collins in reply said that he was not a detective and did not intend to mislead anyone, the information having been given to him as authoritative. He characterized the efforts of gas companies to improve their furnaces by means of recuperators as having entered into a new phase because some of them now call these improvements "reflex." He believed the subject in general to be a comparative one with many cases where either fuel would break 50-50.

Problems and Processes in Heat Treating

Four papers were read and discussed at the Wednesday afternoon session, dealing with widely varying phases of the subject of heat treating. These were, in order, "Heat Treatment of Automobile Parts," by J. M. Watson, Hupp Motor Car Corporation, Jackson, Mich., illustrated by a motion picture; "Die Records and Their Effects on Die Costs," by E. J. P. Fisher, R. Wallace & Sons Mfg. Co., Wallingford, Conn.; "Heat Treatment of Tool Steel," by F. C. A. H. Lantsberry, William Jessop & Sons Steel Co., Ltd., Sheffield, England; and "Progress in the Manufacture and Use of Clay Refractories," by W. G. Owen, Haws Refractories Co., Johnstown, Pa. Lt. Col. Albert E. White, dean of the School of Metallurgy, University of Michigan, Ann Arbor, was in the chair.

Heat-Treating Automobile Parts

Mr. Watson told the story of treatment of axles, steering knuckles, pins, etc., in running comment along with the picture, showing how Brinell tests are made for hardness on every axle and used as a basis for acceptance or rejection. He said that any axle so rejected is practically sure to be of "off" analysis chemically and that the Brinell test has proved an effective check on the chemical analysis. A description of the Hupp process and equipment appeared in The Iron Age, April 10 last, at page 1067.

Taking up some of the phases of his subject, the speaker showed how it is possible to cut a steel rod into four pieces and then heat treat these so that one will come out very hard, one very soft, one so that it can be bent double and will "stay put," and a fourth so like a spring that its elasticity will cause it to vibrate when released after bending. These pieces were shown by the film

To obtain the desired combination of outside hardness and inside toughness required of spring shacklebolts, the treatment consists of heating them to 1650 deg. Fahr. and then cooling them, after which they are reheated and then quenched in oil. For parts where only a "skin-hardness" is wanted, a cyanide bath is used for the quenching operation.

Discussion

Hupp engineers and management, and Mr. Watson in particular, were given credit for courageous pioneering, by F. J. Ryan, president F. J. Ryan Co., Philadelphia, who supplied the furnaces used. In commenting on the paper, he stated that an entirely new type of oven, of new characteristics and with untried materials, was developed for this use. Particularly for the continuous carriers through the furnace was a new departure made, several thousand dollars being tied up in an experiment in which those responsible had much faith but no precedents.

Keeping Tabs on Dies

In his paper on "Die Records" Mr. Fisher detailed work he had done at the plant of R. Wallace & Sons Mfg. Co., silversmith, in putting the die department on a rational basis of watching the life history of each die made and used. This is done by means of three cards, one of which details the elements of cost, a second the test and other "vital statistics" of the die and the material of which it was made and the third the record of work done by the pair of dies.

Mr. Fisher pointed out that there are five cardinal elements in such a record: (1) the kind of steel used in the die; (2) the heat treatment to which it was subjected; (3) the cost of the completed die; (4) its production record and (5) the causes of failure, if any. At the Wallace plant, where 2000 pairs of dies per year are made and used, the set of three cards provides all of this information. Study of the record thus secured makes possible a close control on future die production, improvement in quality, life and cost figures and avoidance of repeating such errors as may have been discovered.

Discussion

In the discussion one speaker drew attention to a case where a tool room force of 90 men, with 4 more in the hardening room, had been cut down to 30 tool room men and six in the hardening room. This was done through study of the die situation, based on accurate and systematic records. Meantime the average life of

a pair of dies had been increased from 25,000 or 30,000 pieces to about 100,000. This result was achieved in about two years.

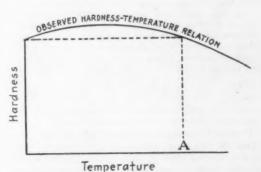
Mr. Taylor, Yale & Towne Mfg. Co., Stamford, Conn., gave similar testimony with regard to buying die steel on the basis of past record. This insured that the metal going into the dies was correct and thus made much easier the task of keeping down the cost element in die manufacture.

Hardening and Distortion

Mr. Lantsberry spoke extemporaneously and very much to the point, giving merely a summary of the contents of his paper, which will be available later. He drew attention to the way in which carbon in iron exists either free, as the carbide of iron, or dissolved in the iron, either as the carbide or as carbon, probably the latter, for the carbide usually is decomposed before going into solution. Before steel containing this carbon can be hardened it must be heated above its critical temperature so that the carbon can go into solution.

In the act of hardening, the steel increases in volume from two causes—the carbon going into solution and the increase in temperature. This fact is important from the point of view of distortion. When excessive care to avoid distortion is required, the steel may be cooled below the upper critical temperature and almost down to its lower critical temperature before quenching. Except for such demand, however, this is not usual, and quenching is done directly after the heating is finished.

Wear hardness in a steel, or more properly, maximum resistance to wear, is not always found in con-



Proper Tempering Temperature for Tool Steels Is at A, Where the Curve, on Its Downward Sweep, Regains the Initial Hardness

junction with maximum Brinell hardness. Wear testing is done by running a sample repeatedly between rollers under pressure and then determining by its loss of weight what amount has been worn away. Material is displaced on the surface, under wear, flowing much more readily with a soft steel. Wear in gages, on the other hand, usually comes from dust particles on the surface, giving abrasive wear.

For tempering tool steel the proper temperature to use is about that at which the hardness corresponds with the hardness of the cold sample, as in the illustration. For high-speed steel the proper tempering temperature is at about 1300 deg. Cent. (2375 deg. Fahr.). Chromium steel usually is heated more slowly, to obtain a soaking effect. This gives it a larger area between the heating and cooling curves. Chromium steel is coming into use slowly in England, as tungsten steels are more in vogue there.

Clay Refractories for Heat Treatment

In his paper on refractories Mr. Owen pointed out that better clay refractories are resulting from greater knowledge of materials and improved processes of manufacture. Brick soon will be classified according to their service requirements. Every brick is a first quality brick for the particular service for which it is suitable. Life of brick greatly depends upon the care exercised in building them into furnaces and the quality of the mortar used in laying them up. Not any one grade of brick will give most efficient results in all

places. The service encountered should determine the characteristics of the brick used. The heat treater's refractory problems should be few at the temperatures at which he usually does his work. A great number of satisfactory brick for heat treating furnaces are available throughout this country.

The Banquet and the Howe Medal

At the annual banquet Thursday evening at the Copley Plaza Hotel, Dr. George K. Burgess announced the conferring, by the board of directors, of honorary



THE recipient of the Henry Marion Howe Gold Medal This Year—Francis F. Lucas-for the Best Contribution to the Society's Literature During the Year. This was published in the Transac tions. Mr. Lucas delivered at this convention a further valuable contribution on highpower photomicrography. He is a member of the New York chapter of the society

membership on Dr. Kotaro Honda, the seventh person so honored. He also presented the president's medal to T. D. Lynch, Westinghouse Electric & Mfg. Co., Pittsburgh, the president of the society last year. For the second time since its establishment by the board, the Howe Medal for the best technical contribution during the year was awarded by unanimous vote of the committee making the award, to Francis F. Lucas, Engineering Department, Western Electric Co., New York. His subject was the discussion of some of his results in high power photomicragraphy—up to 5000 to 6000 diameters.

The toastmaster was S. M. Havens, a director of the society and associated with the Wyman-Gordon Co., in Chicago. The speakers were representatives of the governor of the State and of the mayor of the city, both of whom could not be seen as a contract of the city. both of whom could not be present, and Strickland Gillihan, a humorist of Baltimore, Md. W. H. Patchel, president Institute of Mechanical Engineers, London, England, made a most appropriate

A Luncheon to Dr. Honda

A complimentary luncheon to Dr. Kotaro Honda brought together a number of the distinguished metal-lurgists attending the convention and others representative of the steel industry. Dr. Honda had expressed a desire to meet and discuss informally certain technical problems. To gratify this wish, Dr. George B. Waterhouse, professor of metallurgy, Massachusetts Institute of Technology, Boston, issued the invitations. The luncheon was held at the University Club.

Twenty-one persons sat down at the table and there were letters of regret from ten others. Those who were present were the following:

Dr. George K. Burgess, Dr. John A. Mathews, Prof. Dr. George K. Burgess, Dr. John A. Mathews, Prof. Albert Sauveur, Dr. Zay Jeffries, Prof. H. M. Boylston, Dr. S. L. Hoyt, Dr. F. C. Langenberg, R. M. Bird, Dr. D. J. McAdam, Dr. Paul D. Merica, Prof. A. E. Harder, Dr. E. C. Bain, Prof. E. D. Campbell and his son E. D. Campbell, Jr., C. E. MacQuigg, H. J. French, E. E. Thum, Dr. G. B. Waterhouse, Edwin F. Cone, with the guest of honor, Dr. Honda and F. C. A. H. Lantsberry, Sheffield, England.

Those who were unable to accept were:

Prof. A. E. White, Prof. Bradley Stoughton, Prof. H. Mathewson, Prof. A. W. Ellis (Toronto), Dr. A. F. Benedicks, Prof. William Campbell, John Howe Hall, H. A. Schwarts, H. S. Rawdon and Prof. Henry

After the luncheon an informal discussion of various problems was introduced by Dr. Honda, among these being the nature of martensite.

Annual Meeting and New Officers

The society's annual meeting was held Wednesday morning, Sept. 24, preceding a technical session. The usual reports of officers, particularly the secretary's, were read, all showing a healthy condition. The treasury surplus is large and the total membership has passed 3000 in 29 chapters from the Atlantic to the Pacific. The treasury of some chapters has cash running into four figures.

According to recent changes in the constitution new officers are not elected, for installment into office in January, until later in the year. This is now done by letter ballot. The nominations for the coming year are:

President, W. S. Bidle, president W. S. Bidle Co., Cleveland; secretary, W. H. Eisenman; directors, F. F. McCleary, metallurgist, Dodge Brothers, Detroit; T. F. Hughes, New Departure Co., Hartford, Conn, and Dr. Paul D. Merica, International Nickel Co., New York.

R. M. Bird, now second vice-president, automatically becomes vice-president Jan. 1.

Many New Features in Large Steel Exposition

S TRIKING was the contrast between the steel exposition this year and the first one only five years ago in Chicago. The one last week was extensive in its scope and the largest yet held by the society. The more than 175 exhibitors embraced over 50 machinery companies with the number of individual machines in excess of 140-most of these in actual operation. An impressive fact was the amount of equipment which was new or improved. Some of this will be more fully described in subsequent issues of THE IRON AGE. The more general phase of the exposition was featured by many complete displays including steel companies, heattreating equipment makers, and other allied industries. The following account covers only some of the leading

Electric Heat-Treating Equipment

There were several exhibits of electric furnaces, many of The General Furnace Co., which were in actual operation. Philadelphia, was showing a continuous heat-treating unit, the dimensions of which were 4 x 6 x 15 ft. In this design no part of the conveyor emerges, so that heat lost by exposing the conveyor is eliminated. The furnace, which was automatically controlled, is rated at 40 kw. capacity and 13 conveyor speed changes are available. Of special interest was a working model of an elevator type electric annealing fura working model of an elevator type electric annealing furnace, with a capacity of three 10-ton charges per 24 hr. A car of sheets is pushed beneath the furnace and is elevated by an hydraulic device into the chamber. After the car is elevated the section of track is lowered and the track used for other purposes. A feature is that there is no opening except at the bottom. When the hearth is pushed up, a special sand seal prevents leakage of gas around the bottom. A new tool room furnace, electrically heated and automatically controlled, was in operation at the booth of the George J. Hagan Co., Pittsburgh. A feature is an automatic door sill plate, which permits work to be dragged off the hearth on to a plate in front of the furnace, facilitating operations. A fool-proof feature is an arrangement whereby it is impossible to operate the furnace without the control instrument, but the instrument may be operated without having the furnace under power.

The Eaton Electric Furnace Co., Taunton, Mass., a new electric tool hardening furnace, designated as the No. 1 model J. It is of the cylinder-unit type. A No. 3 model RR electric rotary tempering furnace for production work of small parts was also on view.

A large exhibit was that of the Westinghouse Electric & Mfg. Co., East Pittsburgh, which had several hearth-type electric furnaces, four of which were in operation under automatic control. New equipment exhibited included furnace heating units for heating lead baths, oil tempering baths, etc., and intended for temperatures up to 1700 deg. Fahr. The units are made in 5 kw. capacity, 110 or 220 volts. Two types are available, one of which is rigid and is for use in connection with rectangular tanks. The other type is of fexible construction for mounting around the outside of round tanks. Electric melting pots with automatic temperature control were also shown.

Electric heat-treating furnaces, immersion units and space heaters were exhibited by the General Electric Co., Schenectady. The Hoskins Mfg. Co., Detroit, demonstrated an electric heat-treating furnace having cast heating units of chromel. Broaches, turbine blades and other heat-treated parts were displayed.

The American Metallurgical Corporation, Boston, demonstrated a heat-treating furnace of the open resistor box type, and also an electric lead and cyanide pot type furnace. Electric furnaces were also exhibited by C. I. Hayes, Providence, R. I.

Gas and Oil Equipment Shown

A new type of recuperative furnace, and an automatically controlled gas-fired lead pot were features of a large exhibit by the Surface Combustion Co., New York.

The Carborundum Co., Perth Amboy, N. J., demonstrated a new Carbo-Radiant heat-treating furnace, for which uniform heat distribution, high fuel efficiency, accurate control and prevention of scaling are claimed.

The exhibit of the American Gas Furnace Co., Elizabeth, N. J., was large, a continuous heating machine, automatic quenching tank and carburizing machine being among the equipment shown.

Ryan-Austin automatic control was demonstrated by F. J. Ryan & Co., Philadelphia, in connection with a high-speed tool hardening furnace.

A working model of its automatic rotary annealing and hardening furnace, and also air-tight blast gates, were on view at the booth of the W. S. Rockwell Co., New York. The Hauk Mfg. Co., Brooklyn, N. Y., exhibited Venturi burners.

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The N. C. Davison Gas Burner & Welder Co., Pittsburgh.
exhibited a furnace equipped with its Vesuvius fuel oil burner, demonstrating the economy and efficiency claimed for the burner. The Reeves automatic gas-air pre-mixer was in operation at the booth of the Industrial Gas Equipment Co., New Haven.

Bellis-Lavite furnaces were exhibited in operation by the Bellis Heat Treating Co., New Haven, which displayed also its carbon Lavite, tempering Lavite and high-speed Lavite.

Testing and Other Instruments

A large variety of testing and other instruments were to be seen, the exhibit being considered the best showing of any in this respect,

The Tinius Olsen Testing Machine Co., Philadelphia, demonstrated a new alternate torsion endurance testing machine, developed by Dr. D. C. McAdam, U. S. Naval Experiment Station, Annapolis, Md. By means of this machine the physical properties of various steels may be accurately determined when subjected to high-speed alternate torsion strains. It is intended to permit of accurately selecting steels, and of classifying treatments so as to obtain the most suitable material for the use to which it is to be put. Various types of Brinell hardness and Olsen Last-Word hardness testers, as well as the Herbert pendulum hardness tester, were demonstrated.

A scleroscope, bulb type, electrically operated to facilitate quantity inspection, was shown by the Shore Instrument Co., Jamalca, N. Y. An improved tilting base and clamping swing arm scleroscope set was among other new equipment. Power and hand Brinell machines were exhibited by the Steel City Testing Laboratory, Detroit.

The Bausch & Lomb Optical Co., Rochester, N. Y., had a

The Bausch & Lomb Optical Co., Rochester, N. Y., had a large exhibit of metallurgical microscopes and metallographic apparatus, including a new automatic feed arc lamp. A new series of optical systems by means of which the area of flatness of the image may be increased was shown.

New equipment, shown by E. Leitz, Inc., New York, in-

New equipment, shown by E. Leitz, Inc., New York, included a micro-metallograph, which incorporates a micro-scope of new type. The cross adjustment works on the stage and the fine adjustment works on the lens. The instrument is equipped with conical illumination. A new grinding and polishing machine for metal specimens was also shown, as well as an eye-piece camera known as "Micca," which is described as the smallest and simplest photographic equipment obtainable.

Charles Engelhard, Inc., New York, exhibited a new type S single recording instrument and also type S multiple recorders. Improvements have been made in the rerolling chart and the ribbon printing device, and the scale on the chart is wider than in the company's previous instruments. Mercury switches are employed instead of brush type switches. Accessibility of the chart roll, permitting ease of inserting the rolls, is a feature, and a new 8-day clock is

incorporated. A new electric circuit breaker panel for electric furnace control was also shown, the mercury type timing device employed being a feature.

A tool maker's microscope for checking screw threads as to profile, lead and angle was a center of interest at the booth of George Scherr, New York, who represented Schuchardt & Schütte and Carl Zeiss. The new optimeter, described in The Iron Age of Sept. 25, was also demonstrated, as well as the "Passameter," a new instrument which is intended as an adjustable limit gage and is arranged to eliminate the necessity of "go" and "no go" gages.

The Wilson-Maeulen Co., New York, had a large exhibit, at which its new model recording pyrometer, known as the

The Wilson-Maeulen Co., New York, had a large exhibit, at which its new model recording pyrometer, known as the Tapalog, which incorporates several mechanical improvements and is more accessible than the previous type, was shown. New automatic temperature control equipment built on the unit system, permitting of convenient additions for multiple capacity, was also to be seen. Rockwell direct-reading hardness testers, including a new model 4-B of 12 in. capacity, were exhibited.

Potentiometer pyrometers, including indicating, recording and controlling equipment, were demonstrated by the Leeds & Northrup Co., Philadelphia. Hump electric hardening and electric drawing furnaces were in operation demonstrating different classes of heat treatment.

different classes of heat treatment.

The Brown Instrument Co., Philadelphia, had a large exhibit, which included its new electric CO₂ recorder for power plant use, an electric pyrometer being combined in the same instrument. An electric furnace was in operation, equipped with the company's automatic temperature control.

A large variety of temperature measuring and control devices was shown by the Bristol Co., Waterbury. The Republic Flow Meters Co., Chicago, exhibited indicating and recording pyrometer equipment with thermocouples, etc., a complete line of power plant instruments being also shown. The Stromberg process timing and signaling instrument exhibited by the Stromberg Electric Co., Chicago, was a center of interest.

Improved and New Designs in Machine Tools

Several companies exhibited in the space of the Henry Prentiss Co., New York. Among the new equipment shown was the saddle type cylindrical grinder of the Cincinnati Grinder Co., Cincinnati, in which the wheel-head is cast integral with the base to absorb vibration that might be set up by an out-of-balance wheel. The saddle, which provides means for cross adjustment, carries the sliding table, swivel table, head and footstock. It takes its alinement from a large Vee bearing directly in the center underneath the wheel. The saddle is also supported by two flat bearings, one at each end. Individual foot lever control through one lever, which actuates the table traverse, work revolution and feeding of the coolant, is a feature intended to permit the operator to have two hands free for measuring, etc. Automatic power cross feed to the table and automatic power feed to table traverse are provided. The machine will be available in three sizes: 8 x 18 in., 8 x 24 in. and 8 x 36 in., respectively. Revolving parts run in oil, and automatic lubrication is a feature. The machine was equipped with direct motor drive. The table has 12 traverse speeds and six work speeds. The grinding wheel is 18 in. in diameter, lias a 2-in. face and 10-in hole, but the machine may be equipped also for wide-wheel work. The weight of the machine is 5200 lb. A centerless grinder of for the capacity was also shown in operation.

A redesigned single-stroke surface grinder, designated as the model D, was shown by O. S. Walker Co., Inc., Worcester. The capacity of this machine is for work 12 in. in diameter and 4 in. high under a new wheel.

The Cincinnati-Bickford Tool Co., Cincinnati, had in

The Cincinnati-Bickford Tool Co., Cincinnati, had in operation a 3-ft. radial drill, new features of which include the use of one lever for head-clamping instead of two as heretofore, and the placing of the head-moving hand wheel at the right side instead of at the left. A new 21-in. direct drive movable head upright drill, intended primarily for automobile shops, was among other machines exhibited. Baker Brothers, Inc., Toledo, Ohio, had in operation its No. 121 quick change type drilling and boring machine, the capacity of which is \% to 1\% in. A cam-feed automatic drilling machine of 1\%-in. capacity and intended for production drilling was also demonstrated. Five drilling machine were shown by the Avery Drilling Machine Co., Cincinnati, and a 21-spindle straight-line drilling machine of the Moline Tool Co., Moline, Ill., was in operation.

Cincinnati, and a 21-spindle straight-line drilling machine of the Moline Tool Co., Moline, Ill., was in operation. Stillson wrench frames were being ground by the No. 16-A automatic surface grinder of the Blanchard Machine Co., Cambridge, Mass. The capacity of the machine is for work 6 in. in diameter and 3 in. high and operation is entirely automatic except for loading. The size of the work is controlled automatically to within \pm 0.0005 in. The production is 3000 pieces an hour, taking

NEW UNIVERSAL TURRET LATHE

All Steel Geared Head, Individual Carriage Feeds, and New Turret Binder Are Features

The new universal hollow hexagon turret lathe recently brought out by the Warner & Swasey Co., Cleveland, and shown at two recent exhibitions of which machine tools were a part is illustrated herewith. Although similar in general type to the company's 2-A and 3-A turret lathes, the new machine, which is designated as the No. 1-A, incorporates new features. Principal of these are the all-steel geared head, the increased number and range of feeds, the method of changing feeds in the aprons of the carriages, the patented turret binding mechanism, and the types of tooling. These features together with the double-carriage are intended to provide a machine capable of high production of a wide range of work. In designing the

mechanism, which consists of a two-part collar with a groove which embraces tapered flanges on the bottom of the turret and on the turret seat. By means of right and left-hand screws, manipulated by a convenient lever, the two halves of this collar may be pulled together and the turret bound tightly to its seat. The same lever operates the turret lockbolt.

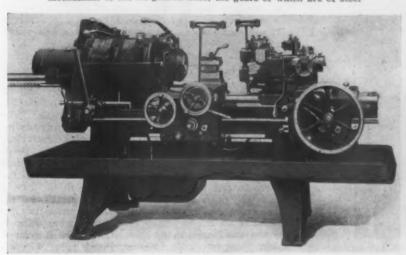
The hollow hexagon turret is equipped with 16 feeds, eight of which are readily obtained by two levers located in the saddle apron itself. An additional lever operates a change gear in the gear box at the head end of the machine, thereby providing 16 feeds from 0.0045 to 0.120 in per revolution of the spindle. Locating the

to 0.120 in. per revolution of the spindle. Locating the feed changes in the saddle apron is intended to reduce substantially the time of changing, and to increase production correspondingly.

duction correspondingly.

Sixteen longitudinal and 16 cross feeds are provided also for the side carriage, which may be operated independently of the hollow hexagon turret carriage and are secured in a similar manner. With this arrange-

New Universal Turret Lathe with Bar Equipment. The insert shows the mechanism of the all-geared head, the gears of which are of steel





new machine special attention is said to have been given to ease of operation.

Being universal, the machine may be equipped for either bar or chucking work with capacity through the automatic chuck collet of 2½ in. for round bars, with a maximum turning length of 26 in. Equipped for chucking work, with a 12-in. chuck, it gives a maximum swing over the carriage of 13% in. and over the ways of 16% in. The arrangement of the speeds in the all geared head is said to provide proper cutting speeds for various metals, in either the small diameters of bar work, or the large diameters of chucking work.

The head of the machine is cast integral with the bed as in other of the company's machines. The gears, which are of heat-treated steel, operate in an oil bath. The system of gearing provides 12 spindle speeds, both forward and reverse, running from 20 to 477 r.p.m. Starting, stopping, and reversing the machine are accomplished through a double friction clutch on the back shaft. Provision is made for choice from two types of motor drive. A motor may be mounted on the head end leg, at the rear, with a belt connection to the single pulley drive, which arrangement is furnished as standard when the countershaft is omitted. Where it is required to keep the entire motor drive arrangement within the floor space occupied by the machine itself, an overhead drive is recommended with a motor mounted on the plate on the head of the machine and driving by silent chain.

The power of the new turret lathe requires increased feed pressure by the turret. For this reason, the latter is clamped into position by a patented turret binding

ment peripheral turning, cross facing, or recessing operations may be performed, by the square turret tools at correct feed, while the hexagon turret may be engaged in drilling, boring or turning cuts at the proper feed. The cross travel of the square turret is 8¼ in. The longitudinal travel of the side carriage is 22¾ in., which may be extended to a maximum of 30½ in., by removing two of the dogs on the stop roll.

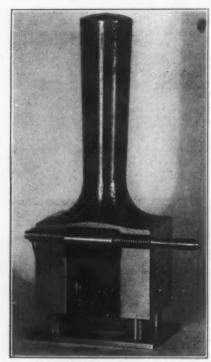
A new overhead piloted turning tool is offered as a standard accessory. The pilot bar is held adjustably in the body of the turning head, and enters a corresponding bushing adjustably mounted on the head of the machine. These adjustments are intended for use in taking up any loss in alinement which may arise. The design is said to compensate for the lack of a center pilot bar when the latter cannot be used, and to increase the rigidity of the machine and tools on heavy work where both center and overhead pilots may be employed.

Activities of the American Body Co. in Buffalo are now being concentrated under one roof. The company has leased from the Terminal Warehouse Corporation, a subsidiary of the American Radiator Co., Building B of the old Curtiss Airplane Co. factory in Elmwood Avenue, a building 600 by 900 feet, the equivalent of half a dozen city blocks. The dry kilns of the body company, formerly located in Tonawanda, will be transferred to the new plant. The American Body Co. manufactures Lincoln, Marmon and Franklin car bodies, in addition to bodies for Pierce-Arrow and International motor buses.

Numbering Machine with New Feature

A new numbering machine designated as the model P-2 and intended for numbering in metal, being adaptable for large heavy machinery as well as small parts, has been placed on the market by the American Numbering Machine Co., 220 Shepherd Avenue, Brooklyn, N. Y. Simplicity of operation and the cutting of clear and uniform numbers or letters are features claimed.

and uniform numbers or letters are features claimed. The new device, which is illustrated herewith, is the same as the company's model P-1 machine previously described, except that it incorporates an automatic feature, being arranged to number consecutively by simply depressing the operating lever shown at the front of the device. The figure wheels are approximately %



Metal Numbering Machine with Automatic Feature. By depressing the lever at the front, the machine will number consecutively

in. above the gage plate, as in the usual hand numbering machine. After locating the machine in the position desired, the shank of the machine is pressed down so that the wheels engage the surface to be numbered. The head of the shank is then struck one sharp blow with a hammer. The gage plate located underneath the machine is fitted with pointers which line accurately with the figures of the machine and permit the operator to locate the numbers quickly.

The machine is of steel and the numbering wheels are of hardened tool steel. Figures are deeply engraved. There are no small parts, and with reasonable care the machine is said to last for many years. The wheels aline themselves and are equally spaced. The figures are engraved an equal depth and are straight and parallel to each other. The entire capacity of the machine may be stamped with one blow, producing as many as eight figures at a time. Letter wheels engraved with 11 letters or less may be substituted for any of the figure wheels.

Powdered Coal in Melting Furnaces

BUFFALO, Sept. 30.—Greater combustion efficiency and elimination of smoke are two of the advantages claimed for a process of feeding powdered coal in melting furnaces, by means of a forced draft. The method is being used in one of the plants of the Pratt & Letchworth Co., manufacturer of malleable castings. The coal is powdered to a fineness of talcum powder and is used with the forced draft in much the same manner as fuel oil is burned. This system was described in The Iron Age of June 5.

Control of Wellman-Seaver-Morgan Co. Acquired by English Company

A controlling interest in the Wellman-Seaver-Morgan Co., Cleveland, has been acquired by the Wellman-Smith-Owen Engineering Corporation, London, England, by the purchase of approximately 12,000 shares of the Cleveland company's common stock. Several weeks ago, an English syndicate composed of individuals connected with the London company took an option on this stock at \$30 a share and this option was

exercised during the past week.

The Wellman-Seaver-Morgan Co. and the Wellman-Smith-Owen Engineering Corporation, which make about the same line of products, have been closely affiliated for a number of years. The two companies have exchanged designs and equipment and the London company has acted as a selling agent for the Cleveland company in Great Britain. It is not expected that the passing of control to the English interests will result in any change in the management of the Cleveland company. The Wellman-Seaver-Morgan Co. manufactures steel plant and coke making equipment, gas producers, car dumpers and other handling equipment. It has plants in both Cleveland and Akron. The company has a capital stock of 25,890 shares of common stock, of a par value of \$100 and 17,057 shares

Quad City Foundrymen Meet

of 7 per cent preferred stock with the same par value.

The Quad City Foundrymen's Association held its first fall meeting at the LeClaire Hotel, Moline, Ill., Monday evening, Sept. 22, to view a film entitled "The Story of Fire Clay Refractories" and to hear an instructive talk on the "Use and Abuse of Refractories" given by D. A. Williston, LaClede-Christy Clay Products Co., St. Louis. Mr. Williston pointed out that less progress had been made in the study of refractories for the cupola and their application or use in the cupola than in any other branch of the metallurgical industry. He asserted that great savings could be made in time and materials if the proper refractories were utilized. The film was loaned to the association by the Bureau of Mines, Department of Interior, Pittsburgh. The attendance was 100.

New Zealand and South Seas International Exhibition

A pamphlet from the commissioners of the 1925-26 exhibition at Dunedin gives the rules governing the system of awards, the official classification of exhibits for judging purposes, grouped according to products, and other information. Metallurgical products in group 2 are given in seven classes, including precious metals, iron and steel, copper, other non-ferrous metals, alloys and combined metals, fittings for metal pipes, and metal cordage. Machinery is carried under group 25, with 24 classes, running all the way from locomotives to sewing machines. Group 27 covers motor vehicles under eight classes, which includes also bicycles.

Republic Bessemer Plant Rebuilt

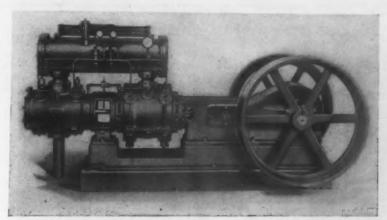
The Republic Iron & Steel Co. has completed rebuilding and rehabilitation of its Bessemer plant at Youngstown, including the installation of much new equipment. The work has been going forward during the summer months as part of the company's program of improvements and expansion at its plants in the Youngstown district. The Bessemer department was scheduled for resumption this week, following successful initial tryouts.

The Republic company has under construction at its plant in Youngstown a new buttweld tube mill, which is scheduled for completion in November. This unit will give the company a total of seven pipe mills, including four buttweld and three lapweld units.

Straight-Line Two-Stage Compressor

Designed to take advantage of the low power consumption per unit of delivery resulting from two-stage compression, the Chicago Pneumatic Tool Co. has placed on the market a new air compressor known as class N-CTB. This is a smaller unit than has heretofore been considered adaptable for this type of design. It operates at 275 r.p.m., with a piston displacement of 360 cu. ft. of free air per minute, and imparts a pressure up to 125 lb. It is driven by belt or by motor.

As the illustration shows, the machine is a tandem unit with the low-pressure cylinder next to the frame. The intercooler is above the two cylinders to facilitate cleaning, which may be done from either end. The subbase gives the machine necessary rigidity. Perfect alinement is assured, giving high mechanical efficiency



Small-Size Two-Stage Compressor of Great Rigidity Is Readily Portable

and a degree of portability not possible in duplex construction.

Automatic operation is a feature. Simplate air valves are used throughout and the splash and flood system of lubrication is employed for all bearings. Cylinders may be lubricated by sight feed or by force feed, the latter being operated either mechanically or pneumatically.

Regulation of air volume and pressure is automatic and can be made to conform to special conditions. Three step capacity regulation is furnished, with two differential unloaders operating automatic unloading Simplate inlet valves. This causes the compressor to operate at full, half and no load, according to demand, and preserves efficiency and an evenly distributed torque. The water control valve automatically stops the flow of cooling water through jackets and intercooler during periods when the compressor is idle, but opens the flow again as soon as the machine goes into operation.

William W. Hearne, Inc., Is Organized

William W. Hearne, Philadelphia, who was an officer and large stockholder of the Matthew Addy Co., now in the hands of a receiver, has organized a new company to be known as William W. Hearne, Inc., and will continue in the business of selling pig iron, alloys, steel, etc., in the offices which had been occupied by the Eastern office of the Matthew Addy Co., Real Estate Trust Building, Philadelphia. The receiver of the Matthew Addy Co. decided to discontinue all branch offices, which left Mr. Hearne free to organize a new company to take over the business which had been done by the Addy company in the East.

The new company is composed of Mr. Hearne, president; Robert I. Daley, vice-president, in charge of the steel department; Claude Anderson, vice-president, in charge of pig iron, coal and coke business in Maryland, Virginia and North Carolina; Oliver Gee, treasurer and general sales manager, and Samuel E. Doak, secretary. In addition to pig iron, ore and fluorspar, the new company will make a specialty of forging steel. It will be the American agent for N. G. Ferguson & Co., Ltd., London, England, handling iron ore, manganese ore and manganiferous ore and will also be the

American selling agent for "Pickelette," a product used in pickling processes.

Mr. Hearne is one of the pioneers of the merchant pig iron business, having been engaged in it about a half century. He started with the Matthew Addy Cocontinued this business under the reorganization and in 1882 and organized its Eastern business in 1899 and incorporation in 1915 up to the present.

Uniform Warehouse Form Adopted

WASHINGTON, Sept. 30.—The adoption of a uniform warehouse form as developed by the American Warehousemen's Association in cooperation with the Chamber of Commerce of the United States and the Department of Commerce, was approved at a general conference of warehousemen, banking and finance organi-

zations, shipping groups and allied groups, held here last Wednesday, under the auspices of the Division of Simplified Practice, Department of Commerce. It was the opinion of the conference, attended by 125 persons, that the general and widespread adoption and use of the proposed form would greatly simplify the clerical work of warehousing, reduce errors, confusion and delays resulting from the present great diversity of forms in use. The plan, if made effective, it was urged, would necessarily reduce expense and avoid waste in distribution.

Secretary of Commerce Hoover em-

Secretary of Commerce Hoover emphasized the necessity of cooperative action in reducing the spread between producers and consumers. A resolution was adopted asking that all interested submit as early as possible suggestions

and criticisms as to the proposed standard terms and conditions, a subject which will be discussed at a further conference to be held soon.

Decline in Railroad Mileage

A compilation made recently by Railway Age shows a decrease in the past eight years of about 4000 miles in the railroads of the United States. Detailed figures by states are given in a table showing the mileage on June 30, 1916, and that on Dec. 31, 1922, while estimates have been made for the period since the lastnamed date. The total given for June 30, 1916, was 254,251 miles. The figures for Dec. 31 of every year since that date showed a decline, until the mileage at the end of 1922 was only 250,413. The largest drop was in 1921, when a loss of 1669 miles was recorded.

Taking the figures by States, the largest loss between June 30, 1916, and Dec. 31, 1922, was in Louisiana, with 538 miles, or 9.6 per cent of the mileage on the earlier date. Colorado lost 531 miles or more than 9 per cent of the initial mileage. The largest mileage possessed by any State is that for Texas, with 16,151 miles at the end of 1922. Illinois stands second, with 12,030 miles, while Pennsylvania has 11,427 miles.

American Radiator Co. Anniversary

BUFFALO, Sept. 30.—More than 1900 employees of the Bond Street plant of the American Radiator Co., last week participated in a celebration of the 21st anniversary of the establishment of a plant of the American Radiator Co. in Buffalo. George R. Corwin, general manager of the Bond Street plant, was presented a floral piece, the largest ever constructed in Buffalo.

Steel barrels produced by 30 establishments in August numbered 385,354, compared with 398,397 in July and with 385,155 from 29 establishments in June. Shipments during the month were 388,141 and unfilled orders at the end of the month were 690,480. The number of barrels on hand was reduced during the month from 46,398 to 43,611.

High-Speed Metal Sawing Machine

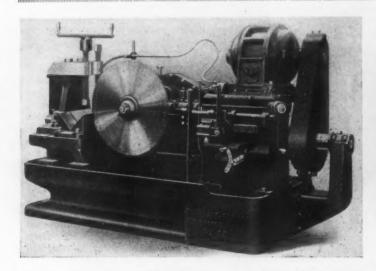
A high-speed cold saw designated as the No. 66 and incorporating improved features has been placed on the market by the Cochrane-Bly Co., Rochester, N. Y. The capacity is for bars 10 in. in diameter or 9 in. square; 12-in. I-beams and rectangular sections 8 x 12 in. Oil-flooded worm gear drive, rigid carriage construction, and positive geared screw feed are claimed to provide smooth operation, and permit of fast feeds and low cutting cost.

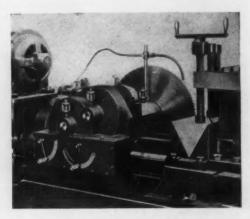
To eliminate vibration and chatter the machine is provided with a saw arbor 5 in. in diameter, hardened and ground and fitted into a solid bearing. The carriage is cast solid around the ways and is fitted with adjustable taper gibs full length. There is no bolted joint

either front or rear, for operating the friction clutch, start, stop or reverse of feed and hand adjustment of the carriage to or from the work.

The driving gears are all fully inclosed in the saw carriage and run in a bath of oil. The worm is of hardened steel, 1 in. pitch and triple lead, and the worm shaft is provided with a 5% in. ball thrust bearing. Sliding gears on the worm shaft give cutting speeds of 30, 40, 50 ft. per min. respectively. The worm gear shaft, intermediate shaft and pinions and all spur drive gears are of nickel steel, hardened.

The double screw vise shown in the accompanying illustration of the machine is standard equipment but a 60-degree V-block and 3-screw vise for the multiple cutting of small round bars is available. The capacity of the 60 deg. fixture is for 151 ½-in. bars and 4 4-in.





High-Speed Cold Saw. The rear view above shows arrangement of screw vise and V-block

in the arbor bearing nor in the carriage bearing on the ways. The arbor is provided with a brake which is intended to absorb lost motion in the driving gears and eliminate gear chatter and pounding of the saw teeth when cutting angles, tubing and other light sections.

The feeds are geared and positive and the feed screw is mounted directly in line with the center of the saw arbor and close to the saw blades so that the feed thrust is almost directly in line with the blade resistance. The feed changes are made through a sliding gear and tumbler, 11 changes ranging from ½ to 2½ in. per min. being available. The carriage has automatic quick return with safety limit stops and adjustable trip stops for the full range of the carriage travel. The machine has a two point control from

bars. A hand-operated stock-feeding device, which is also standard equipment, is intended to feed the bar and automatically measure the length of the piece to be cut. The motor drive is through a silent chain, the sprockets and chain being fully inclosed. The out and inboard bearings are ring oiling and the clutch gear or pulley is provided with an oil reservoir and self oiling bushings.

The saw blade employed is 28 in. in diameter and ¼ in. thick. The size of the work table is 21 x 25 in. and the height of work table, 24 in. The speed of drive shaft is 300 r.p.m. For motor drive a 15-hp. 900 r.p.m. motor is recommended. The floor space occupied by the machine is 40 x 104 in., and the weight is 7000 lb. net. The weight crated is 7400 lb.

Plans of Belfont Steel & Wire Co.

The Belfont Steel & Wire Co., Ironton, Ohio, has definitely abandoned, for the time being at least, the building of a steel plant is connection with its blast furnaces and wire mills.

The Chamber of Commerce of Ironton will sponsor the sale of \$667,000 worth of 8 per cent preferred stock of the company in order to furnish it with working capital sufficient to carry on an extensive program for the manufacture and sale of its wire products. It is expected that the greater part of this stock will be disposed of in Ironton and vicinity. A committee of the Chamber of Commerce has been investigating the financial position of the company, and has reported that its quick assets are over half a million dollars in excess of all its liabilities. The sale of the preferred issue will enable the company to secure sufficient working capital to put it in a strong position in the trade.

The company owns two-thirds interest in the plant of the Ashland Steel Co., which supplies it with its rods, and recent improvements at this plant will enable it to reduce materially the cost of production. A plan is now being worked out whereby hot metal from the Norton Iron Co.'s furnace will be available at all times, thus eliminating the necessity of producing pig iron at Ironton and shipping it to the plant across the river.

At a meeting of stockholders of the Belfont company, resignations of four Cleveland directors were accepted, and the following were named to take their places: B. A. Wallingford, Walter-Wallingford Co., Cincinnati; W. C. Willard, Huntington National Bank, Columbus; Charles Horn, president of the First National Bank, Huntington, W. Va., and J. A. Ryan, of the Ryan & Gilfillan Co., Ironton. The other members of the board are President, I. P. Blanton; vice-president, S. G. Gilfillan, S. Coles Peebles and A. C. Speak.

The Colonial Steel Co., Pittsburgh, has closed with the American Bridge Co. for a 8-ton Heroult electric furnace.

Importance of Industrial Coal Storage

Details Worked Out by American Engineering Council for Many Manufacturing Centers—Saving in Cost Contemplated

New York, Sept. 17.—Storage will assure a continuous and reliable supply of coal throughout the country, it is asserted in an analysis of the needs of communities and industries accompanying a series of summaries of regional conditions to be embodied in the report of the Coal Storage Committee of the American Engineering Council, of which W. L. Abbott of Chicago is chairman.

"From the standpoint of consumers in both large and small communities," according to the analysis, "the first requisite is that the supply should be freed from irregularities having their origin largely in artificial causes. There is a negligible amount of intentional manipulation of the market, but flurries and near panics are frequent. Consumers are often responsible for them."

The engineering committee has established a storage practice for leading industrial centers, using as a standard an average monthly shipment plan. As to this the analysis said:

"Evidently it is essential that the consumer store coal. The ideal practice would be for him to store during the summer a large portion of the amount consumed during the winter. But as such an ideal is too much to expect, the committee has set up as a standard

an average monthly shipment plan.

"Compliance with such a standard would mean that
(1) the consumer would store a minimum amount of
coal and such would not be in storage for a great length
of time; (2) the transportation agencies would be relieved of the inordinate peak demands and would be enabled to move coal at less expense than now; (3) the
producer, knowing what his monthly demands would be,
could so arrange his operation schedules as to produce
coal at a much less cost per ton. Eventually, should
such a practice become generally and regularly followed, the amount of storage required would be reduced
materially, but this cycle of improvement can be initiated only by consumers."

The Chicago committee of the council's main committee based its conclusions on data from 14 representative industries having a consumption of 4,638,600 tons, representing 15 per cent of the total coal moving into the Chicago district. "Only 6.7 per cent of the total annual consumption of these industries should be stored if all of the users were purchasing coal on the basis of uniform monthly shipments," this committee reported. "This is a larger percentage than that pertaining to Philadelphia, but in comparison with most of the medium and large cities of the country, it is a low percentage.

"It means that if the users generally in this district were purchasing coal on contract basis with equal monthly shipments, the aggregate storage bill would be but a small amount when distributed over the entire year's supply. Undoubtedly some industries would be obliged to store a larger percentage, but the typical establishment is in a fortunate condition in this respect."

Quantitative Results in Many Centers

The uniform monthly shipment plan recommended by the engineers for Chicago would, it was said, result in monthly shipments of 386,550 tons to 14 consumers, seasonal storage of 295,500 tons, seasonal storage 6.4 per cent of annual consumption, reserve storage 7.1 per cent of annual consumption, total storage 13.5 per cent of an annual consumption of 4,638,600 tons.

Application of this plan, it was declared, would produce these results in typical communities, a group of typical consumers in each community being the basis of calculation:

Columbus—Monthly shipments of 16,583 tons, seasonal storage of 25,700 tons, seasonal storage 12.9 per cent of annual consumption, reserve storage 7.1 per cent of annual consumption, and total storage 20 per cent of annual consumption.

Cincinnati—Monthly shipments of 55,033 tons to 12 consumers, seasonal storage of 52,500 tons, seasonal storage 7.6 per cent of annual consumption, reserve storage 7.4 per cent of annual consumption, and total storage 15 per cent of annual consumption.

Dayton—Monthly shipments of 20,683 tons, seasonal storage of 47,100 tons, seasonal storage 12.3 per cent of annual consumption, reserve storage 7.2 per cent of annual consumption, and total storage 20 per cent of annual consumption.

Akren.—Monthly shipments of 94,400 tons, seasonal storage of 90,300 tons, seasonal storage 8 per cent of annual consumption, reserve storage 7 per cent of annual consumption, and total storage 15 per cent of annual consumption.

Detroit.—Monthly shipments of 22,483 tons, seasonal storage of 426,400 tons, seasonal storage 16.4 per cent of annual consumption, reserve storage 7 per cent of annual consumption, and total storage 23.4 per cent of annual consumption.

Grand Rapids.—Monthly shipments of \$166 tons to 7 consumers, seasonal storage of 4200 tons, seasonal storage 4.2 per cent of annual consumption, reserve storage 7.4 per cent of annual consumption, and total storage 11.6 per cent of annual consumption of 98,000 tons.

Indianapolis.—Monthly shipments of 57,108 tons, seasonal storage of 76,350 tons, seasonal storage 11.1 per cent of annual consumption, reserve storage 7.4 per cent of annual consumption, and total storage 18.5 per cent of annual consumption.

Fort Wayne.—Monthly shipments of 14,833 tons, seasonal storage of 14,150 tons, seasonal storage 3 per cent of annual consumption, and total storage 15 per cent of an annual consumption of 178,000 tons.

St. Louis.—Monthly shipments of 125,983 tons, seasonal storage of 201,300 tons, seasonal storage 12 per cent of annual consumption, reserve storage 7 per cent of annual consumption, and total storage 20 per cent of annual consumption.

State of lows.—Monthly shipments of 33,825 tons, seasonal storage of 22,500 tons, seasonal storage 5.6 per cent of annual consumption, reserve storage 7.4 per cent of annual consumption, and total storage 13 per cent of annual consumption.

Omaha.—Monthly shipments of 30,158 to six consumers, seasonal storage of 9,150 tons, seasonal storage, 3.8 per cent of annual consumption, reserve storage 7.2 per cent of annual consumption, and total storage 11 per cent of an annual consumption.

Denver,—Monthly shipments of 10,583 tons to three consumers, seasonal storage of 2700 tons, seasonal storage 2.1 per cent of annual consumption, reserve storage 7.4 per cent of annual consumption, and total storage 8.5 per cent of an annual consumption of 127,000 tons.

Salt Lake City.—Monthly shipments of 8075 tons to 15 consumers, seasonal storage of 15,650 tons, seasonal storage 16 per cent of annual consumption, reserve storage 7 per cent of annual consumption, and total storage 23 per cent of an annual consumption of 96,900 tons.

Seattle.—Monthly shipments of 21,066 tons to the consumers, seasonal storage of 42,800 tons, seasonal storage 16.9 per cent of annual consumption, reserve storage 7.1 per cent of annual consumption, and total storage 24 per cent of an annual consumption of 252,800 tons.

Abnormal irregularity of consumption was reported in Columbus. A wide variation in tonnage consumed was found in Akron. Detroit, it was said, presented one of the most complex problems encountered in the whole investigation. A more uniform shipment during the navigation season might, it was suggested, be helpful in northern Michigan.

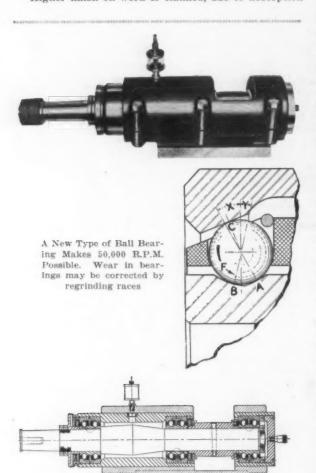
In Omaha the period of storage, rather than storage capacity, needed revision. Unusually wide variations in monthly consumption figures were shown in Salt Lake City. Irregularity of demand, it was stated, made necessary a higher per cent of storage in Seattle.

INTERNAL GRINDING SPINDLE

Employs Three Ball Bearings of a Type Recently Developed

A new type of internal grinding spindle, for which several advantages are claimed, has been put out specifically for use on Heald internal grinders. The spindle is made by the Ex-Cell-O Tool & Mfg. Co., Detroit, which is also the licensed manufacturer of the type of ball bearing employed in the spindle.

Higher finish on work is claimed, due to absorption



of belt vibration by the rear body. The thrust is divided between the front bearing and that in the rear body. The importance of this feature is emphasized where face or shoulder grinding is to be done. Longer life is claimed because the belt load, which is greater than the load on the wheel, is distributed to an additional bearing and housing.

The ball bearing, three of which are used in the above spindle, is of the combined radial and thrust type and is said to be capable of sustaining speeds up to 50,000 r.p.m.

Referring to cross-sectional drawing, it will be noted that angle X is greater than angle Y. This brings point A farther from the axis of rotation than point B, causing the ball to rotate faster at A than at B, forming an axis at C, with rotation in the direction of F as well as in the direction of travel of the race. This, it is claimed, will eliminate the wearing of flat spots, or tracks, on the balls. Wear may be corrected, it is said, by grinding the inner faces of the two halves of the

outer race or by regrinding the raceways at a cost of approximately 25 per cent of the original price. Bakelite separators are used which are light and reduce friction.

Reorganization Plan of Wickwire Spencer Steel Corporation Approved

Seventy-seven per cent of the Wickwire Spencer Steel Corporation stockholders, at a special meeting last week, approved the reorganization plan submitted. A new corporation is to be formed, presumably under the laws of Delaware, probably to be known as the Wickwire Spencer Steel Co. T. H. Wickwire, Sr., becomes chairman of the board of directors. T. H. Wickwire, Jr., continues as president of the company and Samuel E. Pryor, chairman of the executive committee, Remington Arms Co., Bridgeport, Conn., will be chairman of the executive committee. Harry W. Goddard will retire as chairman of the board but will continue as a director. Stocks and bonds of the present company will be exchanged for those of the new corporation, and indebtedness to banks will be converted into notes on the new company.

Capitalization of the new company will be as follows: \$12,679,000 7 per cent mortgage bonds due in 1935; \$1,686,000 7½ per cent 10-year secured notes, due in 1932; \$2,515,000 7 per cent five-year class A notes; \$3,639,400 6 per cent five-year class B notes; and 1,815,000 shares of common stock of no par value, of which 958,750 will be issued. The class A notes will provide working capital and the class B notes will provide for indebtedness to banks. The \$2,515,000 new working capital has been underwritten by parties interested in the company and by investment houses, and the new common stock has been taken care of in the same manner.

A voting trust has been created comprising Frederick W. Allen, Samuel F. Pryor, T. H. Wickwire, Sr., and Richard B. Young. W. A. Wickwire continues as vice-president, and L. E. Crandall has been elected a vice-president, in charge of merchandising sales and distribution. Mr. Crandall was for many years connected with the Simmons Hardware Co. and later was vice-president in charge of sales, merchandising and distribution of the Winchester-Simmons organization. John A. Delholm, formerly sales manager of the hardware division of the corporation, will act as general sales manager.

Arrangements have been made with Harry W. Goddard and the Spencer Wire Co., Spencer, Mass., whereby the \$200,000 annual principal payments toward the purchase of the Goddard plant will be suspended for five years. The new company, however, is to pay 6 per cent interest on deferred payments.

During October special efforts will be put forth to reduce to a minimum and eliminate altogether, if possible, lost time accidents at the plants in the Youngstown district of the Carnegie Steel Co. Safety rallies will be held for the several departments, special safety exhibits will be displayed and speakers will discuss various phases of accident prevention. Sherman Rogers of New York, safety engineer, opened the campaign at a gathering of employees held Sept. 27 in the Masonic Temple, Youngstown. Alfred C. Cook, superintendent of the safety, welfare and claims department of the Carnegie company at Youngstown, is in direct charge of the campaign.

The Starrett Tool Co., Athol, Mass., fine tools, is operating full on a 50 hr. per week schedule. The company employs approximately 500. A few operatives are working nights.

Chicago Base Is Named for Steel Pipe

Youngstown Company Takes Unexpected Action, Indicating Tendency of Independents to Cooperate with United States Steel Corporation—New Selling Methods Being Developed

CHICAGO, Sept. 30.—The Youngstown Sheet & Tube Co., the only manufacturer of steel pipe with plants operating in the Chicago district, has announced Chicago district base prices on that commodity. This action was taken notwithstanding the fact that the order of the Federal Trade Commission did not cover tubular products and on those commodities that it did specify was limited in its application to the United States Steel Corporation. The announcement of the Youngstown Sheet & Tube Co. was therefore a surprise; at the same time, it was a further indication that independent mills will cooperate with the Steel Corporation in its compliance with the commission's order.

The new Youngstown price schedule provides for discounts at Evanston, Ill., and Indiana Harbor, Ind., which are two points lower than the discounts at its mills east of here. For delivery at Chicago, discounts will be 2½ points lower than at the Eastern mills or ½ point lower than at the Chicago district plants. In effect, the prices f.o.b. Evanston or Indiana Harbor mills will be \$4 a ton higher than at Eastern mills, whereas Chicago delivered prices will be \$5 a ton higher. The products affected are ½ to 12-in. standard black and galvanized wrought steel pipe and 2½-in. to 12-in. line pipe.

The new quotations represent a concession similar to, but not so large as, those in wire products and sheets announced last week by the American Sheet & Tin Plate Co. and the American Steel & Wire Co. Considering the fact that less than one-tenth of the pipe of the country is made in the Chicago district, there was little or no expectation on the part of Western buyers that a separate basing point would be established here.

Independents Express Much Dissatisfaction

Feeling Increasing That Federal Trade Commission Has Aided the Steel Corporation—Much Uncertainty as to Sheets

PITTSBURGH, Sept. 29.—The change from an f.o.b. Pittsburgh method of quoting steel to an f.o.b. mill or a delivered price basis, with freight indicated from mill to destination, may now be regarded as an accomplished fact so far as pipe and wire products are concerned, but the situation otherwise is highly unsettled and there is still much uncertainty as to just where the market is as to prices of the products other than those referred to.

The Youngstown Sheet & Tube Co. has announced basing points at Lorain, Ohio, this because the freight rates from that point over most of the country are almost identical with those from Youngstown; at Evanston, Ill., and Indiana Harbor, Ind., where it has plants, and also a base for Chicago, which includes the freight charge from its Chicago district mills into the city. The National Tube Co. as announced in THE IRON AGE last week, established basing points at Lorain, Ohio, and Pittsburgh. As Wheeling, W. Va., has practically the same freight rates to distant points as the Pittsburgh district, the prices at that point may be considered to be the same as those at Pittsburgh district mills. For all intents and purposes, basing prices at Pittsburgh, Youngstown, Wheeling and Lorain are the same. Base prices at Evanston, Ill., and Indiana Harbor are \$4 per ton over those at the points mentioned, while to take care of the freight into Chicago, the price there will be \$5 over the Eastern producing districts.

Lowest Freight Rate

In the billing of shipments, and in this all companies subscribe, the lowest freight to destination will be charged. In other words, the price will be based on the point from which the freight to destination is least. Thus, a Pittsburgh district taking business outside of Pittsburgh to the West can bill from any of the points mentioned, whichever has the lowest freight to delivery point. Billing from the Chicago district mills gives them the advantage of the higher base at that point, but also entails the absorption of freight to that point. This move is a distinct advantage to Western con-

sumers and jobbers and is one in which Eastern jobbers and consumers do not participate, so far as steel pipe is concerned, for the reason that the Pittsburgh district is the nearest point of production from which the East can draw. With steel pipe plants west of Pittsburgh, the Western consumers are the chief beneficiaries of the change in the mode of quoting. It may occasion some surprise that Pittsburgh district independents are naming the point with the lowest freight to destination as the basing point, but that is merely another way of saying that competition of the future is to be upon delivered prices and the delivered prices will be those established by the mills nearest the delivery point.

Lorain, Ohio, as stated in the Pittsburgh market report in THE IRON AGE last week, has a freight advantage over Pittsburgh district mills into the West and Southwest of about \$1 a ton. Since Youngstown and Lorain freights to the West and Southwest are substantially identical, Youngstown also has \$1 a ton freight advantage over Pittsburgh. Pittsburgh mills to get business would have to absorb the freight difference to get business in competition; hence, the general subscription to the idea of billing on the point with the lowest freight to destination. Possibly, the development of a really active market will make a change in the price alinement and permit mills with freight advantages over others to take advantage of them, but that active demand is not present just now and the leading interest having decided upon the same base price for Pittsburgh and Lorain, it may be some time before there can be a change. The same base for the two points of manufacture of the National Tube Co. creates the idea that costs at both plants are the same and it will be difficult in the future to eradicate that idea.

Independents Adopt Wire Schedule

Leading independent producers of wire products have gone along with the basing points plan evolved by the American Steel & Wire Co. Here, as with pipe, competitive reasons are responsible, since to ship from Pittsburgh into the various districts at the prices established by the leading producer means the absorption of freight and a lower net mill price. The question for independent producers was whether they would stay in the business, and the answer was quickly found.

The situation as to sheets is not definitely clarified by the announcement of the American Sheet & Tin Plate Co., setting up a base for its Pittsburgh district mills and one \$2 a ton higher for Gary and \$3 a ton higher for delivery into Chicago to consumers having railroad sidings. The Chicago district prices prevail only for the common finishes of sheets, black, galvanized and blue annealed, as only those grades are produced at Gary mills. As a general rule, independents still are billing, if not on a Pittsburgh base, on a delivery price that is really Pittsburgh plus freight to destination. There is pretty common complaint among independents that the Chicago prices named by the Steel Corporation sheet-making subsidiary "cut the cloth too tight" to fit them, and that they are effectually shut out of that district.

Chicago district sheet prices suggest a producing cost higher in that district by \$2 a ton over Eastern mills of the leading interest. Independent manufacturers have indicated that a proper spread would be \$5 per ton to cover the difference in costs. If the recent minimum Pittsburgh base prices of independent manufacturers be taken, then the new Chicago district bases are \$4 to \$5 a ton higher than those of makers in the so-called Eastern territory. Figuring again on the independent minimum prices, the saving to Chicago city consumers is a matter of \$1.80 per ton, instead of \$3.80, as first suggested.

Cold-Finished Steel Bar Prices

Local makers of cold-finished steel bars are pretty much upset by the action of the American Steel & Wire Co. in naming a Cleveland base of 2.70c., which is the same base as is observed here. On screw stock, the principal outlet is to the automobile parts makers and while automobiles are built in Detroit, it is claimed they are produced in the Cleveland district. One maker here says that 30 per cent of its production goes to Cleveland automobile parts makers and that a 2.70c.-base at Cleveland means the absorption of from half to all of the 19c. per 100 lb. of freight to Cleveland from Pittsburgh. An interesting situation is created by the fact that another subsidiary of the Steel

Corporation furnishes much of the hot-rolled bar tonnage used by cold-finished bar makers in this district. It looks as though there would be a demand by these interests for a revision on the prices on hot-rolled bars to enable them to get into Cleveland on even terms with the American Steel & Wire Co.

Similarly, makers of cold-rolled strips are upset by the setting up of Cleveland and Worcester, Mass., bases on that product, with Cleveland on the same base as Pittsburgh, or 4c. So far, independent companies are holding to a Pittsburgh base on this product.

The Carnegie Steel Co. has yet to make any definite statement as to its plans for meeting the new situation. This company for some time has been quoting on a delivered price basis, meeting competition in the East to an extent and letting the Illinois Steel Co. take care of the situation west of the area in which Pittsburgh is at an advantage in the matter of freights.

Outside of wire rods, which are priced at \$46, base, Pittsburgh or Cleveland mills and \$48, Chicago district mills, by the leading makers, there has not been much in the way of definite information as to semi-finished steel prices. Mill bases seem probable.

Complaints of the Independents

There is still much dissatisfaction among independent producers over the change in the mode of quotation and the scheme of doing business. The comment that the Federal Trade Commission decision makes a monopoly of the Steel Corporation by virtue of its widely scattered locations is a common one. It is asserted that the Government is now engaged in making prices and selling conditions for the industry. Another comment is that by the decision the Federal Trade Commission case against the Bethlehem Steel Co. must fall to ground, since in absorbing the companies it did there was no removal of competitors, but merely the strengthening of the market position of the buying company by getting mills near a point of consumption. This is the basis for suggestions of the possible merging of companies with plants at widely different locations. With Pittsburgh no longer the sole basing point, prices will be different at different mills and a case cannot be made that competition is thereby restricted. Meanwhile, a number of independent manufacturers are waiting the secondary reaction -that from the consumers.

Commission May Modify Its Order

Any Effort to Evade Would Receive Attention, but Attitude of Steel Corporation Is Approved

WASHINGTON, Sept. 29 .- The Federal Trade Commission is frankly pleased by developments during the past week in the adjustment of the iron and steel industry to the new method of quoting prices, following the abolition of the Pittsburgh base. It is evident that the commission is willing to give the trade ample time to reconstruct its basis for naming prices and has been especially gratified at the changes already announced by the United States Steel Corporation. The attitude of the independents also is being watched with interest and confidence is expressed that they will follow the policy of the Steel Corporation. It is the belief of Federal Trade Commission authorities that independents will naturally follow the policy of the Steel Corporation and will be compelled to do so, especially in a market like that now obtaining, in order to meet Steel Corporation competition. It has been stated, however, that if it should develop that there is any effort made not to obey the order, regardless of the source, and it should tend toward "substantially lessening competition," the order will be so modified as to see that it is obeyed in every sense. The nature of such modi-

fication was not indicated, and apparently the possibility of being called upon to take such action is considered to be so remote that it is too early to give attention to a specific plan of modification.

Favors Steel Corporation

It is understood that the commission realizes that the order actually has worked out more favorably to the Steel Corporation, with its wide distribution of plants, than to the independendents with their more limited production areas. This, it is declared, had been expected, but at the same time it is held to be entirely within the law of economics, built up from quoting prices f.o.b. mill or invoicing shipments on a delivered basis with the freight from the producing plant indicated to consumers. The contention is that this tends to bear out claims that such a condition will mean further development of the iron and steel industry in centers outside the Pittsburgh area, notably the Chicago district. Talk already has increased about further mergers and that Eastern companies would have plants in the Middle West, so as to be put on the same basing equivalents in points in that section with the Steel Corporation. But the reports, so far as Washington is concerned, are entirely lacking of confirmation. The question of such mergers "substantially lessening competition," under the Clayton act, or restraining trade under the Sherman act enters into the discussion and leads some here to doubt that any especially important consolidations are in contemplation.

More Adjustments Expected

Reports come from the trade that there are a number of adjustments yet to be considered as the result of the order so as to quote prices along the line it specified. Developments in this direction are said to give promise of coming about soon. It is said that a portion of them at least will concern new basing methods such as those now obtaining on wire and on some of the heavier products. The numerous basing points that already have been established are expected to increase. For instance, it is apparent the Steel Corporation is expected soon to announce prices on wire and steel bars at its Duluth plant. It is claimed that the latter method will give Duluth district consumers lower prices than St. Paul-Minneapolis district consumers, while testimony given for the commission showed that under the Pittsburgh basing system the opposite situation prevailed.

Varied Press Comment

The action of the steel industry in readjusting methods of quotations has developed a deluge of press comment from all over the country. Some producing centers now evidently are expecting to be much more important as manufacturing points of iron and steel and it has been observed that Chicago interests particularly are speculating on opportunity given that section for wide expansion and there are some who go to the extent of seeing it become a greater center of production than Pittsburgh itself. The general opinion, even of those who believe Chicago will profit at the sacrifice of Pittsburgh, does not confirm this view.

In any event, so far as the Federal Trade Commission is concerned, its position seems to be one of "watchful waiting," meanwhile being satisfied with the progress that it says has been made. The commission apparently is willing that sufficient time and latitude be given to the trade and to let complete solution of the numerous problems rest with the industry and its consumers. It is not thought it will seek to take any action unless it feels assured that it is altogether necessary to have the order carried out.

Complications in Selling Wire Products

NEW YORK, Sept. 30.—The establishing of five separate basing points for wire products by the American Steel & Wire Co. has already brought to light interesting realinements of the price situation, as affecting consumers, which may point to numerous similar complications when the full effect of the abandonment of Pittsburgh basing has been determined.

Under its new basing plan, the American Steel & Wire Co. has a price of 2.65c. per lb., Worcester, on wire as compared with a Pittsburgh price of 2.50c. A large customer of the American Steel & Wire Co., located at Worcester, will therefore be able to supply its requirements at 2.65c., while two of this company's competitors, located at New Britain, Conn., will be obliged to pay 20c. per 100 lb. freight, or 2.85c., delivered, thereby being at a freight disadvantage of \$4 a ton as compared with the Worcester competitor. When wire was sold exclusively on a Pittsburgh basis, all New England consumers received their raw material at an equal price, assuming, of course, that none of the concessions sometimes granted to special customers were granted in these instances. Concessions to one,

however, would probably have been granted to the others; so the delivered prices would have been identical in any event.

If the New Britain consumers, above referred to, were to buy from mills in the Pittsburgh district, the delivered price would be 2.865c., including the full freight, but even if the Pittsburgh mills made the delivered price 2.85c., the same as that of the American Steel & Wire Co.'s Worcester works, they would still be at a \$4 a ton disadvantage compared with a Worcester competitor. This disadvantage will probably have to be absorbed in the costs of the New Britain companies as New England freight rates to points south and west are in almost all instances alike regardless of the exact shipping point.

Bolts, Nuts and Rivets Now Affected by Commission's Order

In last week's issue of THE IRON AGE, it was stated that bolt, nut and rivet prices were not affected by the Federal Trade Commission's order, as they had been quoted on a Chicago base as well as Pittsburgh for more than two years. There is no reason to believe that this statement is erroneous despite newspaper reports to the contrary. In response to an inquiry as to what its policy would be, one of the leading bolt and nut manufacturers of the country writes as follows:

"There are all kinds of reports appearing in the papers as regards the position of the bolt and nut people in connection with the abandoning of the Pittsburgh plus situation by the steel companies.

"We do not know exactly what the other bolt and nut people are doing, but our position is this—that we have adopted Pittsburgh and Chicago as basing points, equalizing freight with Pittsburgh or Chicago in accordance with the location of the customer. I think this is the position that is being followed by everyone. It is the position, as we understand it, that is taken by the Steel Corporation in selling bars, which is the line in which we are interested. Certain it is that there is no feeling or intention on the part of the bolt and nut people to do other than that which they think the public interest demands, or that the Federal Trade Commission would desire.

"It is a possible thing that we may have to entirely change our method of selling our product, but it seems to me that if we follow out the plan that we are now pursuing of having two basing points, it will be fair and equitable to all concerned."

Much Dissatisfaction Owing to New Selling Methods

CINCINNATI, Sept. 29.—Elimination of the Pittsburgh plus method of quoting steel prices has not made much headway in the time elapsing since the Steel Corporation announced its abandonment of the system. It is expected that this week, however, the elimination of Pittsburgh plus, as far as it is going to be eliminated, will be complete.

To date the only changes announced affecting this territory have been made by the American Steel & Wire Co. and the American Sheet & Tin Plate Co. Independent companies generally maintain the Pittsburgh plus method of quoting, making delivered prices based on Pittsburgh prices.

The abandonment of the Pittsburgh plus method has been very confusing to buyers of steel, the majority of whom have not yet had an opportunity of figuring out just where they stand under the new conditions. The opinion is generally held among buyers that a return to the old method will result eventually, and some even go so far as to predict that in 30 to 60 days Pittsburgh plus will be reestablished.

European Markets Not Yet Stabilized

English Pig Iron Weak and Prices Lower—Sharp Advance in British Rails—German and French Prices Down

(By Cable)

LONDON, ENGLAND, Sept. 30.

PIG IRON is weaker, on increasing Continental competition in export markets. Makers are anxious for orders but the buying of home consumers is restricted to bare necessities. The outlook is unfavorable.

Hematite home demand has broadened but the export business still is poor and prices are easier. Foreign ore is dull and easier. Sellers of Bilbao Rubio ask 21s. 6d. (\$4.79) ex-ship Tees.

Finished steel is slow in all heavy departments. Makers are inclined to accept lower figures but buyers are indisposed to purchase. The Redbourn Hill Iron & Coal Co., Ltd., Scunthorpe and Frodingham, has closed.

Clyde shipbuilding output in September was 17 vessels launched, aggregating 44,772 tons gross register. Swan, Hunter & Wigham Richardson, Ltd., Wallsend-on-Tyne, has secured from Belgium a contract for four vessels of 2000 tons each.

Sheets and Tin Plate

Tin plate business is dull, but there is a fair inquiry from all parts. Most works are offering October shipment on basis schedule. Lower prices are improbable, owing to increasing wages.

Galvanized sheets are weak, No. 24 gage corrugated bundles being sold at under £18 (3.58c. per lb.). Makers generally are naming £18 and upward. The [expected] Indian demand has not materialized.

Black sheets are quiet and unchanged.

On the Continent of Europe

It still is difficult to gage the Continental situation. Prices vary greatly, according to the positions of the makers' books. Most of them are in want of orders but buyers are not anxious to commit themselves.

German cold rolled steel strip is quoted at £13 (2.59c. per lb.) delivered Midlands. Sheet bars are being sold at £5 10s. (\$24.53) f.o.b. The general tendency is easier.

British Iron and Steel Industry at Low Ebb— Depends on Machinery Contracts

London, England, Sept. 18.—The depression in the iron and steel trades for several weeks past still continues and the outlook is no more favorable. The buying of all kinds of material is at a low ebb and were it not that a number of plants have received substantial contracts in connection with the railroads and tube extensions, the industry would be in a very bad state. The price of pig iron comes lower and lower day by day, but apparently is still not sufficiently cheap to attract buyers in bulk and producers assert that they are heavy losers. That there is something in this is quite evident from the fact that several of the big companies have been obliged either to curtail or to pass entirely their dividends resulting from the past year's working.

Although a lot is heard about foreign competition, the fact seems to be that there is, so to speak, a buyers' strike throughout foreign purchasers and even Continental makers are finding it difficult to get work to keep them occupied. Cleveland No. 3 today is worth about 82s. (\$18.28), while East Coast mixed numbers can be disposed of for about 90s. (\$20.07), but in all cases makers have substantial stocks at their yards, and these are accumulating. Steel prices have shown no change for a long time past and business in consequence, particularly as regards overseas trade, is exceptionally poor.

Contracts for six oil-tank steamers of 10,000 tons

British and Continental prices per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at \$4.46 per £1, as follows:

Bilbao Rubio ore† 1 4 Cleveland No. 1 fdy 4 6½ Cleveland No. 3 fdy 4 1½	19.29 18.17	Continental Prices,	All F.		Channel	Ports
Cleveland No. 4 forge 3 19 ½ Cleveland basic 4 2½	17.95 F 17.73 18.39 20.07	belgium £3 France 3			\$16.50 16.50	
East Coast hematite 4 19 to £5 0s. (a) Ferromanganese 13 10 and 13 0*	22.08 to \$22.30	Luxemburg 3 sillets:	14		16.50	****
Billets 7 10 to 8 5 Sheet and tin plate	33.45 to 36.79	Belgium 5 France 5		5 71/2 S. 5 71/4 S.	23.41 to	\$23.97 23.97
bars, Welsh 8 121/2	38.46 M	Ierchant bars:	5 66	0 672	C. pe	
Tin plates, base box 1 3½	5.24 C. per Lb.	** * .	171/2 to	6 5	1.17 to	1.24
Ship plates 9 5 to 9 15	1.84 to 1.94	Luxemburg 5	171/2 to	6 5	1.17 to	1.24
Boiler plates	2.59 to 2.69 1.84 to 1.94 1.69 to 1.79	France 5 oists (beams):	17½ to	6 5	1.17 to	1.24
Beams 8 5 to 8 15	1.69 to 1.79 1.64 to 1.74	Belgium 5	15 to	6 0	1.14 to	1.19
Round bars, % to 3 in. 9 12 % to 10 2 %	1.92 to 2.02	Luxemburg 5	15 to	0 6 0	1.14 to	1.19
Galv. speets, 24 gage 18 0 to 18 10 Black speets, 24 gage 13 0 to 13 5 Black speets, Japanese	3.58 to 3.68 2.59 to 2.64 A	France 5	15 to	6 0	1.14 to	1.19
specifications 15 5 Steel hoops 10 15 and 12 10*	3.04 2.14 and 2.49* 1/2	Belgium 8	0 to	8 5	1.59 to	1.64
Cold rolled steel strip,		Belgium 7	0 to	7 10	1.39 to	1.49
20 gage 16 0	3.18	Germany 7			1.39 to	1.49
*Export price. †Ex-ship. Tees, nominal.	i	-in. plates: Luxemburg 7		7 10	1.39 to	1.49
(a) Nominal.		Belgium 7		7 10	1.39 to	1.49

gross each have been placed with Dutch shipbuilders by the Anglo-Saxon Petroleum Co. The cost is stated to be approximately £1,300,000 (\$5,800,000), or £2 5s. (\$10) a ton cheaper than the lowest British tender. On the other hand, however, although the vessels will be built on the Continent, British material will be supplied, thereby showing that the contract has been lost to this country almost entirely upon the question of wages.

Harland, Wolff & Co., will construct four twin-screw oil carrying vessels, each of 305 ft. length for A. Weir & Co. Stewarts & Lloyds, Glasgow, have secured the contract for steel pipes for the Sudan Government in connection with the Port of Sudan water supply scheme; this will include 17 miles of 6-in. mild steel pipes. The East Indian Railway has placed a contract with George Turton Platts & Co., Sheffield, for 6500 complete large railroad buffers.

The publication of the annual report of the Hamburg Shipowners' Association for the year ended June 30 last (this is the first report issued since before the war) makes interesting reading in connection with the German merchant marine. It states that nothing can be more absurd than the statements made outside Germany of the rapid development of German shipping. In 1914 the German merchant tonnage amounted to 5½ million gross tons and, in the ordinary course of the country's development, it would have been somewhere about 7½ to 8 million tons; whereas the actual figures are less than 3 million tons.

There has been a heavy falling off in the amount of goods taken by sea and in the big expansion of business when freights were high, which built the short-lived boom following the Armistice, the German merchant marine, which had no ships, was unable to share, and the reconstruction of the marine had to be met with greatly increasing expenses. The process of inflation did a lot of damage to the industry as a whole and it is stated that German shipowners have much cause for anxiety and a steadily increasing burden of taxes.

FRENCH MARKET UNSTABLE

Iron and Steel Prices Lower and Some Furnaces May Be Blown Out

Paris, France, Sept. 12.—The market remains hesitating and instable. The political chaos and anxiety for the future—whether the price of coke or the forthcoming Franco-German commercial pact is in question—do not appear near solution. While some believe in a not distant lower price of coke, others expect to find, in the diminution of custom tariffs on German products, the means of securing from markets across the Rhine more advantageous prices than those of our producers—hence two good reasons for buyers to stand aloof.

Exports.—For the first seven months of 1924 France exported to the United States a total of 11,616 tons of pig iron; 3047 tons of forged and rolled iron and steel, in blooms, billets, bars, etc., and 3338 tons of rails.

Coke.—In the first nine days of September the ORCA has received 83,714 tons of Ruhr coke, or a daily average of 9300 tons. During August the average was maintained at about 10,000 tons a day, according to the industrialists' wish. As the elements constituting the price of coke remain the same as during the previous month, there likely will be no alteration in the price. But French metallurgists for several months now have paid 145.25 fr. per ton (\$7.88), delivered at frontier station Sierck, while the Belgian price is established at 146 fr., Belgian, or 135 fr., French (\$7.33). As this difference does not appear to be based on any available consideration, the French Government is taking all necessary steps to bring the price of French coke nearer to that paid by our Allies. Furthermore, we hear from an authorized source that, in Belgium, reparation coke is to be reduced from 146 to 135 fr. very shortly.

Iron Ore.—The situation is not quite so good as at the beginning of the year, a period of large productive activity consequent on the depreciation of the franc. The market however is favorable, with the exception of calcareous ores of Nancy and Longwy. Disposals in Briey ore are quite short and prices are easily maintained at 22 fr. per ton (\$1.19) for the 35 per cent grade and 26 fr. (\$1.41) for the 38 to 39 per cent; the Thionville Minette, yielding 22 per cent, is worth 16 to 17 fr. (87 to 92c.).

When our home consumption was at its highest point the Belgians were complaining bitterly of being short of supplies; although the situation has been improved since, they have had to find some other sources of supply. In Great Britain the contracts arranged in South Wales are being completed; in Scotland, where small contracts of a few thousand tons are not at all scarce, we continue to make regular shipments. In Germany the contracts for Briey ore, expiring July last, have not been renewed for lack of disposable ore.

Pig Iron.—The situation is not improving and other furnaces likely will be blown out. It seems that the extreme price concessions that producers are able to

make have been reached and the ruling quotation for chill-cast No. 3 remains at 300 to 315 fr. (\$16.28 to \$17.10), according to tonnage. However, a founders' cooperative association could, in August, realize its average selling price at 297.45 fr. (\$16.14) for the same grade of iron. A leading firm of Meurthe-et-Moselle was able to accept the price of 295 fr. (\$16) for amounts varying from 50 to 180 tons. These rates—the lowest applied since the Ruhr occupation—have induced many foundries to cover their needs far into September and October.

The rate of 83s. at producing works for Cleveland iron No. 3 (353 fr. or \$19.15 at the present rate of exchange) can hardly compete with ours, hence the small consumption of these products in this country. In Belgium, as a decline in the price of coke is anticipated, business in this line is at a standstill; the Lorraine and Luxemburg plants are more active on the Antwerp market, nominal rates for chill-cast No. 3 being 330 to 340 fr. Belgian (312 to 321 fr. French or \$16.93 to \$17.42); basic iron is worth 10 fr. less.

The quotations for hematite are 400 to 420 fr. per ton (\$21.70 to \$22.80) at works; export is somewhat quiet in this line. The competitive British price stands at 91s.—shipping docks—or, delivered, slightly higher than ours.

Ferroalloys.—The market is still quiet, although a better tendency has developed. In ferromanganese, Anglo-Norwegian competition has forced the prices under the level of cost, or £13 (1100 fr., or about \$59.70) and 1200 fr. (\$65.10) on truck, Rouen; in such conditions French producers, in maintaining their, prices 200 fr. higher, have little chance of doing business; they are waiting for the moment the competition ceases. The prices of the Comptoir Français de Ferro-Alliages are not much altered, except for a 20-fr. reduction, at 860 fr. (\$46.67), on the 25 per cent grade and 25 fr., at 1875 fr. (\$101.75), for the 75 per cent grade. These rates are, anyhow, nominal, hence subject to change. Spiegel with 10 to 12 per cent Mn. is quoted at 500 to 525 fr., about, (\$27.13 to \$28.50) on truck East.

Semi-Finished Products.—The tone of this department remains favorable. Our exports to Italy are satisfactory; in Antwerp the Lorraine and Luxemburg plants are better placed than the Belgians. The inland rates per 100 kg. at works are: 42 to 43 fr. for blooms; 44 to 45 fr. for billets. The export rates are nominally: 450 to 460 fr. for billets; 485 to 495 fr. for largets; 515 to 520 fr. for bars. The British quotations are not under £5 2s. to £5 4s. for blooms; £5 10s. to £5 12s. 6d. for billets; £5 12s. 6d. to £5 14s. for largets (£5 2s.—425 fr.; £5 14s.—475 fr.) c.i.f.

Rolled Steels.—The situation of rolling mills becomes very difficult owing to the prices quoted by the steel-works. The average basis quotation remains at the same level: 50 to 52 fr. for beams, and 55 to 60 fr. for merchant grades. In the Sarre the rates on Sept. 1 were: 53.50 fr. for beams; 57.50 fr. for merchant steels (per 100 kg. on truck at French frontier, customs included). For large tonnages, 1.50 to 2 fr. rebate off these prices is granted. Due to the rise of sterling,

prices stand firmer. The ruling quotation for standard 46-kg. (93-lb.) rails is 50 to 52 fr. (\$27.13 to \$28.22).

On the export market the rates are £5 16s. 6d. to £5 17s. 6d., previous level for beams and bars. The Luxemburg plants are quite active, but the Lorraine, rather well booked ahead, are no keen competitors for the Belgian plants. The export quotations stand as follows: beams, 520 to 525 fr. bars, 520 to 530 fr.; rods, 600 to 650 fr.; wire rod, 610 to 620 fr.; hot rolled hoops, 775 to 800 fr.; cold rolled hoops, 1100 to 1150 fr., f.o.b.

Plates and Sheets.—Activity is lower, due to a fall in the consumption, heavy sheets, in particular, while output is large. Prices stand relatively high if compared with the merchant grades, thus leaving room for concessions. In Lorraine the following are recorded: large flats, 70 to 72 fr.; heavy sheets, 75 to 78 fr.; medium sheets, 90 to 95 fr.; light sheets, 100 to 110 fr. The export trade is rather difficult and German competition keen in heavy sheets, at £7 to £7 2s. 6d. The Belgians quote 630 to 650 fr., f.o.b. Medium and light sheets are improving: 3 mm., or No. 11½ gage, 700 fr.; 2 mm., or No. 14 gage, 775 fr.; 1.5 mm., or No. 16½ gage, 890 fr.; 1 mm., or No. 19½ gage, 1050 to 1075 fr.; 0.5 mm., or No. 25½ gage, 1200 to 1250 fr.

Wire Products.—Still lifeless. Wire rod, 59 to 62 fr. in Lorraine. The rate of 100 fr. per 100 kg. of clear (plain) wire could not be maintained.

GERMAN IRON AND STEEL

Market Weaker and Prices Lower—Russian Orders Increasing

(By Radiogram)

BERLIN, GERMANY, Sept. 29.—The home market is weaker, with the exception of scrap, and all prices are downward. Coal prices have been cut 10 per cent. Foundry coke is now quoted at 25 gold marks per metric ton (\$6.05 per gross ton).

The pig iron syndicate has cut prices by 6 to 8 gold marks per ton, according to the district. Steel ingots now are quoted at 90 marks (\$21.78 per gross ton); steel bars are 112 marks (1.21c. per lb.); thin steel sheets are 167 marks (1.80c. per lb.).

Railroad freight rates have been cut 10 per cent. Domestic buyers, however, are showing reserve in purchases, in expectation of a further price fall. Foreign orders for railroad materials and for machines are increasing. The same is true of Russian orders.

Coal is still a drug in the market. The German Upper Silesian iron concerns are in a bad condition and one-third of their employees have been discharged.

INCREASED ACTIVITY

Judge Gary Makes Statement as to Operations— His Views on Politics

Chairman Gary of the United States Steel Corporation said Tuesday that finishing mills of the Steel Corporation subsidiaries are operating between 63 per cent and 65 per cent, and that bookings and shipments are considerably better in September than August, with inquiries decidedly improved.

"I rather expect further improvement before the meeting of the American Iron and Steel Institute, on Oct. 24. At that time I shall make a more detailed statement on conditions," the Judge added.

Questioned as to his opinion on the election probabilities, Judge Gary said:

"If I should say that there is any reasonable doubt, it would be tantamount to saying that it is impossible to know whether or not the majority of the people of this country are in favor of continued prosperity.

"There are always a number of people who cry calamity, who seem to thrive and glory in adversity, and whose principal occupation seems to be to stir up trouble, depression, inactivity in business and despondency, with the apparent view of bringing everyone down to a level of poverty and unhappiness.

"Such as they cry out against the Government, the courts, the laws, the successful people, and all those who are more or less favored because of their energy and industry. But I think the large majority of the people in this country, women and men, desire prosperity and comfort and happiness for all; they want thrift, activity, economy and saving, with fair treatment, full opportunity and success to everyone up to the full measure of merit.

"What candidates in the present campaign are most likely to secure and maintain these desirable conditions?" was asked.

"The majority of the voters are going to answer these questions. They are inquiring, reading, listening and thinking about them. They are not going to be fooled by the demagogues or the vicious propagandists.

"If the majority of voters are wise we shall see big business coming on pretty fast after election. If unworthy politicians have their way, business will not be so good, and idleness will be increased.

"I have not expressed my opinion of the different candidates and do not intend to do so, although I have no doubt as to how they should be and will be answered by the intelligent, right-thinking electorate."

EXPORT TRADE FAIR

Large-Scale Business from Japan, but Chinese Markets Affected by War Are Quiet—Japan Asks for Rails

New York, Sept. 30.—With the exception of inquiries from large Japanese consumers and municipal purchases, which continue to accumulate, there is but little activity in foreign trade. Occasional small lots of wire shorts are reported sold to Chinese merchants, but other materials even with low prices quoted are not in demand. Japanese merchants are still interested in purchasing light gage black sheets, but with the domestic market in Japan at \$89 to \$90 per ton, the present quotation of American mills of about \$95 per ton is not interesting to the prospective buyer. Japanese inquiries for rails and railroad equipment continue a feature of the market. Bids have been opened by the Nippon Oil Co. on the 56,000 boxes of tin plate recently inquired for, but award is still pending.

Among current railroad inquiries in the market from

Among current railroad inquiries in the market from Japan is a specification of the South Manchuria Railway Co., bids opening Oct. 6 on 43 miles of 100-lb. rails and accessories. Another rail inquiry in the market is from the Kobe Municipal Tramway Bureau for 6½ miles of 90-lb. T rails with accessories, 7 switches and several crossovers and curves. A privately owned Japanese railroad is asking for 92 tons of car material for construction of 23 cars. An inquiry is expected to develop soon from the Tobu railroad for about 10,000 ft. of pipe.

The civil war in China seems to have particularly affected the Shanghai market, where dealers were caught with heavy stocks of iron and steel on hand with but little prospect of moving them until the cessation of hostilities. The machinery market is also seriously affected in Shanghai, business being virtually at a standstill. The Canton district has also been caught with stocks on hand and serious disturbance of business in North China is reported as a result of the activity of Chang Tso Lin. The movement of commercial cargo, says a report to the Department of Commerce, is disrupted as the railroads are being practically monopolized for the movement of troops and supplies. In consequence, exports are dwindling rapidly and import business is feeling the effects of restricted buying. The general opinion is that cargo now affoat will be accepted but some cancellations are reported.

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Price Unsettlement

THE fluency of the comment poorly informed 1 and absolutely uninformed writers have made on the abandonment of Pittsburgh plus, and on what will come of it, is quite in contrast with the way men long in the steel trade hesitate to prophesy as to consequences. When Judge Gary went to Washington five years or so ago to talk the situation over informally, he told the Federal Trade Commission that if an action were brought to abolish Pittsburgh basing it would be one of the "biggest lawsuits ever tried." He had in mind the great fabric of business that had been built up on the Pittsburgh pricing system and the widespread unsettlement that would result from tearing out that foundation.

Those who are glibly writing that the disturbance due to the effort to comply with the Trade Commission's order will be temporary, have little idea of the serious questions manufacturing consumers of steel already are asking, and of the uncertainties they are facing in respect to their own and their competitors' raw material costs. Not only will the new régime make it harder for a steel company to know what delivered prices other steel companies are making, but buyers of finished steel will be put to it to determine at what price they should sell in order to maintain their competitive position. Taking wire products for illustration, the five basing points provided by the Steel Corporation's zoning plan will make many changes in the competitive line-up of manufacturers who buy from the various wire companies. Consumers located at or near the basing points will have advantages over those who must now pay several dollars a ton in freights.

It is being borne in upon some buyers of steel that perhaps Pittsburgh plus has been thought of too much in the light of its effect on Western consumers, particularly those naturally tributary to Chicago district mills. Eastern and Southern consumers are finding possibilities of changes in the radius of their operations that had not entered into their early calculations on the results of the order of July 21. Some Western buyers of steel products, who had counted only the advantages they would get from Chicago basing, are finding that Southern competitors will reap substantial benefits from the Birmingham basing adopted by the Steel Corporation.

Only experience with the intricacies of the new market situation will demonstrate the extent of the handicap it imposes on the independent steel company with plants in a single locality or district, in its competition with the Steel Corporation. In times of slack demand the Steel Corporation's advantage will be more marked. When demand taxes capacity, prices will rise to such an extent that a freight advantage of a few dollars a ton will drop out of the account. And if the régime of f.o.b. mill prices or of delivered prices makes the earning of a profit more difficult to the average steel company in times of limited or of only moderate demand, there will be the inevitable compensation of higher price peaks when the market turns in the seller's favor and consumers are clamoring for material that can't be supplied. In other words, future boom markets will miss the stabilizing influence of Pittsburgh plus.

A surprising phase of the present uncertainties in which buyers and sellers are groping is the readiness with which some consumers have concluded that their horizon will now be greatly extended. Assuming that Pittsburgh prices, or a close approach to Pittsburgh prices, will prevail in their particular section, they are laying plans for selling in territory heretofore beyond their reach. Such plans may well be put to the test of months of experience under the new régime, before any considerable outlay is made for an enlarged business. It is no régime of price fixing by decree into which the steel industry has come. Mills from which consumers have been drawing their supply are quite certain to charge in the future as in the past prices determined largely by the remoteness or proximity of competing mills. Whatever the passing of Pittsburgh plus may have abolished, it has not abolished common, every-day economics.

More Light

National gatherings, such as the notable convention of the American Society for Steel Treating, draw a large number of men from all parts of the country. The reasons are many. Perhaps no two men would give the same answer to the question, "Why do you come?" But it is probable that many of the replies would be related to the desire to rub elbows with men having common interests, to share in their enthusiasm and to gain inspiration from their accomplishments.

In the routine of daily tasks one easily loses the proper perspective. He may even go so far as to remark, as was overheard at Boston in a conversation with a European visitor: "Why come to America to talk to metallurgists? You'll not find many worth the trouble. It's mostly a vast volume of testing and a small trace of thinking!" That pessimistic utterance was belied within two hours. On the same platform appeared two men, each seeking light on one metallurgical problem. But in what different ways! One was straining the resources of high-power microscopes, oil-immersion lenses, light filters and even ultra-violet light to resolve the infinitely small details of crystallographic structure. The other was debarred from microscopes by a blindness which struck him thirty years ago. But in his mind's eye he has been able to see these same things with astonishing clarity.

It would, indeed, be a dull spirit who could fail to gain a thrilling emotion from that modest talk given by Prof. E. D. Campbell, outlining his investigations into the nature of steel. Thirty years is a long time in the history of modern metallurgy. Yet even that far back, a victim of a laboratory explosion, he started work on the most difficult conception about the nature of steel, namely, that it is a true solution of iron and carbon, different from a solution of salt in water only in that one is solid and rigid, the other fluid and mobile. Steel had to be investigated by indirect tests-oh, how indirect to the blind man-in fact, not even devised. Liquid solutions could have been studied from a dozen angles by equipment already standardized. No one would have criticized him for taking the easier way.

That is, no one but Campbell himself. So, in all these years he has been working away in his laboratory at Ann Arbor, as he says, "striving to gain a little light" on the nature of steel.

University of Michigan engineers have a great inheritance. Whenever they are at their wits' ends and ready to quit, all they need to do is to remember Professor Campbell, take a fresh grip and go ahead.

COST saving is the motive of the effort now being made to induce engineers to indicate weights on drawings for iron and steel castings. In practically all cases these weights are estimated where the drawings are made and the necessity for the foundry to repeat these calculations, involving

in many cases hours of high-priced labor, is a distinct economic loss. Particularly where castings are quoted on the pound basis would it be useful to have the preliminary estimate of the designing engineer and thus avoid the necessity for duplication of this work. Incidentally, quotations would be expedited by providing this information, as much time would be saved which now is devoted to the second calculation.

Gaging Business by High Records

In all the business indexes that are referred to for information upon the state of trade there is a great difference between the high records and the averages. The more common disposition is to compare the latest figures with the record rather than with the average. As a stimulus to the individual, reference to the record is quite appropriate, for in all activities men should try to do better and better. As a gage of what is occurring, however, reference to average or normal is more illuminating and informing.

By comparison with averages the present state of trade is rather an active one. Few records are being broken, but record breaking cannot be expected to be a continuous performance.

In Portland cement June, July and August each made a new high record in shipments. The use of cement in general construction work has been increasing right along, and year by year there is more road building. Weather having been adverse in the early part of this year, there was some delay in the work and therefore an extra pressure beginning with June.

Of all important trade indexes the production of steel ingots perhaps shows the greatest fluctuation. Before the war there were wide swings in steel production, but since the war the swings have been much wider and in addition they have occurred in shorter periods. There is a great difference between the average and the record. The daily rate of ingot production in August was 97,750 tons. One comparison is that the August rate was 36 per cent above the July rate, which seems quite favorable. Another comparison is that it was 166 per cent above the rate in July, 1921, which appears very favorable indeed. The rate in July, 1921, was the lowest in many years. Still another comparison is that it was 39 per cent under the rate last March. This comparison is quite unfavorable. Last March showed the highest production rate in the history of the steel industry.

The more rational comparison and the least familiar one is with the average rate since the war. The average rate of production of steel ingots from Jan. 1, 1919, to Aug. 1, 1924, was about 110,500 tons. Production last August was 11½ per cent below this average. The showing is a drab one, relative to a gain of 166 per cent or a loss of 39 per cent, but it is really the more informing comparison.

Then we have freight car loadings. Most of the references this year to car loadings have emphasized the point that they have been running below those of last year. Of late the records of 1923 have been closely approached and the tone of the common analyses is that at least we are getting somewhere. The point that this year's car loadings are second best in the whole history of commerce receives little attention.

Farm Products Higher Priced

THE Bureau of Labor's index numbers of wholesale commodity prices in August, just issued, show a further improvement in the position of the agriculturist. The index number (1913 = 100) for farm products rose from 140.9 in July to 145.3 for August, or by 3.1 per cent, while the index for all commodities rose from 147.0 to 149.7, or by 1.8 per cent. Taking the 1913 relationship as standard, farm products were 6.1 points below the general average in July, but only 4.4 points below in August.

There are two points in this matter—whether the position of the farmer has really been bad from a properly long range viewpoint, and whether if so relief can or should be furnished by governmental action. One difference between farmers and others is that farmers take more stock in politics than others, and are more disposed than others to turn their eyes to Washington when they wish that things would change in their favor.

Before the war the Bureau of Labor's index numbers were computed by taking the average prices in the ten years, 1890 to 1899, as base. Since the war the single year 1913 has been made the base. This change of base made a great difference, for in 1913 farm products had risen more than other products. With 1890-9 as base, in 1913 farm products were 165.8, but commodities in general only 135.2.

The improvement in the position of the farmer just before the war, which the general public then

looked upon as one of its hardships, is shown by the following table. It is computed from the old relatives, based on 1890-9 as standard, and shows the relationship between farm products and commodities in general. The relatives for the first ten years average 100, with 1896 as the year of lowest purchasing power for crops and the five years before the war as a period of very high purchasing power:

Farm Products Relative to All Commodities

	(1890-9 Standard)	
1890 98	1898 103	1906 101
1891 109	1899 98	1907 106
1892 105	1900 99	1908 108
1893 102	1901 108	1909 121
1894 100	1902 116	1910 125
1895 100	1903 105	1911 125
1896 87	1904 112	1912 128
1897 95	1905 107	1913 122

It might be argued, however, that the condition of 1890-9 is out of date and the farmer is entitled to something better than that. Then the figures below may be of interest. They are based on the 1913 standard, and show the relation of farm products to commodities in general, on the assumption that the 1913 proportion is 100:

Farm Products Relative to All Commodities

	(1913 Standard)	
1900	86 1908 96	1916 97
1901	94 1909 100	1917 107
1902	96 1910 102	1918 112
1903	90 1911 100	1919 112
1904	94 1912 103	1920 96
1905	92 1913 100	1921 84
1906	90 1914 105	1922 89
1907	93 1915 103	1923 92

The corresponding relative for August, 1924, would be 97. It chances, as a matter of fact, that the average of the relatives for the 24 years covered by the above table is also 97, the same as at present. This means that the farmer has had his ups and downs in the past quarter century, with an average purchasing power of his product 18 or 20 per cent greater than in the ten years preceding, and is now exactly at this quarter-century average.

Youngstown Manufacturers Adapting Themselves to New Conditions

Youngstown, Sept. 30.-Independent steel manufacturers in this district are proceeding cautiously in meeting the new situation created by the abandonment of the Pittsburgh price basing custom by the United States Steel Corporation. The Youngstown Sheet & Tube Co. has created basing points on pipe at Indiana Harbor and Evanston, in addition to the Pittsburgh base. In other rolled products, the Sheet & Tube company, the Republic Iron & Steel Co. and other independents are meeting each inquiry as an individual matter, and quoting prices accordingly. Inquiries reaching branch offices are submitted directly to the home offices and individual attention is accorded each inquiry. Naturally, this is simply a temporary expedient, and involves much additional detail on the part of sales departments.

On wire products and sheets, quotations submitted on inquiries are equalized as much as possible to meet the Steel Corporation subsidiaries' new prices.

While definite policies will grow out of the current situation, nevertheless it seems likely that more individual attention must necessarily be accorded hereafter to specific inquiries.

John A. Topping of New York, chairman of the board of directors of the Republic Iron & Steel Co., was in consultation Monday with sales executives of the company in this city.

The non-integrated sheet rollers at Niles as a rule

are quoting mill prices on sheets, plus freight, though delivered prices are also being quoted.

On wire products, the Sheet & Tube company, the chief producer in this district, is at some disadvantage with the leading interest in Chicago and points farther west. The new prices of the American Steel & Wire Co. at Chicago are only \$3 per ton higher than the Pittsburgh base prices, whereas the freight rate from Youngstown to Chicago is about \$6.40 per ton.

Youngstown to Chicago is about \$6.40 per ton.
On shipments to the West Coast, it is claimed the Youngstown maker, shipping via the Panama Canal, will have an actual advantage over Chicago.

Youngstown prices of \$2.55 per 100 lb., Pittsburgh base, for plain wire, and \$2.80 for nails, per base keg, will be superseded in the Chicago district by equalized quotations.

More and more it becomes evident that each producer will be required to act on his own initiative to a larger extent, and particularly in periods of reduced buying when competition for tonnage is keen. It is also evident that the problems confronting the independent producers as a result of the new situation will not be immediately determined, and that it will be difficult to formulate a general policy which will successfully apply.

The advantage of the Steel Corporation is also evident. However, the independents are determined to meet the situation with aggressive methods and to strengthen their competitive position as far as possible. Mergers of producers with properties in diversified locations are being predicted.

SEPTEMBER IRON OUTPUT

Increase Over August 6334 Tons Per Day

Net Gain of 21 Furnaces, with 23 Blown In and Only 2 Shut Down

September operations of blast furnaces, according to returns collected by telegraph on the last day of the month, show a marked gain in production over August. With the last day's output estimated, the September total is 2,016,275 gross tons, or 67,209 tons per day. The August output was 1,887,145 tons, or 60,875 tons per day. The September gain therefore in daily rate is about 10.5 per cent against a gain of about 6.5 per cent in August over July.

Twenty-three furnaces were blown in and only 2 were blown out, making a net gain for the month of 21 furnaces. The gain in August was 7 furnaces. Of the 23 furnaces blown in during September, 14 were independent steel company furnaces, 5 were Steel Corporation furnaces and 4 merchant stacks. The 2 furnaces shut down were independent steel units.

On Oct. 1 172 furnaces were active, compared with 151 active on Sept. 1. Of these 172 furnaces the production of 16 had to be estimated for this preliminary report. The final figures for the month will be published in THE IRON AGE, Oct. 9.

Among the furnaces blown in during September were the following: Three furnaces at the Lackawanna plant of the Bethlehem Steel Corporation in the Buffalo district; one furnace at the Bethlehem plant of the Bethlehem Steel Corporation in the Lehigh Valley; one furnace at the Steelton plant of the Bethlehem Steel Corporation in the lower Susquehanna Valley; No. 6 Duquesne furnace of the Carnegie Steel Co. and one Eliza furnace of the Jones & Laughlin Steel Corporation in the Pittsburgh district; one furnace at the Cambria plant of the Bethlehem Steel Corporation and the Perry furnace in western Pennsylvania; the Oriskany furnace in Virginia; two furnaces at the Maryland plant of the Bethlehem Steel Corporation in Maryland; Grace furnace of the Youngstown Sheet & Tube Co. and two Ohio furnaces of the Carnegie Steel Co. in the Mahoning Valley; the Dover and United furnaces in central and northern Ohio; the Portsmouth furnace in southern Ohio; one furnace of the Illinois Steel Co., one furnace of the Youngstown Sheet & Tube Co. and one Gary furnace in the Chicago district; one furnace of the Sloss-Sheffield Steel & Iron Co. and one furnace of the Woodward Iron Co. in Alabama.

Among the furnaces blown out or banked in the month of September were the following: One furnace of the American Rolling Mill Co. at the Columbus works in central Ohio and the furnace of the St. Louis Coke & Chemical Co. in Illinois.

Eliminating Varieties of Hardware

Washington, Sept. 30.—Plans for the elimination of varieties of several hardware items are under consideration by manufacturers, and it is expected that definite steps will be taken this fall toward reducing the present varieties and widths of wire screen cloth, drop forged wrenches and back saw blades.

forged wrenches and hack saw blades.

Producers of wire screen cloth are cooperating with the American Hardware Manufacturers' Association and the Division of Simplified Practice of the Department of Commerce. At a conference in New York last week, 11 manufacturers were represented. F. J. Root, New York Wire Cloth Co., was named temporary chairman, and T. E. Richards, American Wire Fabrics Corporation, was chosen as temporary secretary. It was decided to secure the opinions of all screen manufacturers as well as the opinions of members of the American Hardware Manufacturers' Association, the Southern Hardware Jobbers' Association and the National Hardware Association of the United States.

Surveys will be made soon, by the Division of Simplified Practice, of the production and sales of drop forged wrenches, for the purpose of considering tentative recommendations for the reduction of sizes, models and varieties.

Reports received by the Division of Simplified Practice from 16 manufacturers of hack saw blades are being analyzed, and a summary will be presented to a conference of manufacturers at Atlantic City, N. J., this month.

Effect of New Basing Point for Pipe

Youngstown, Sept. 30.—New basing discounts announced by the Youngstown Sheet & Tube Co., at Evanston and Indiana Harbor on steel pipe represent an increase of two points over the Pittsburgh base. The new Chicago base is therefore 60 off the list as compared with 62 off at Pittsburgh. The Chicago base is thus about \$4 per ton higher than that at Pittsburgh. The freight rate on pipe from Youngstown mills to Chicago territory is \$6.80 per ton, and under the new basing arrangement therefore, Chicago district buyers are benefited to the extent of \$2.80 per ton, in comparison with previous Chicago prices.

Plans of Youngstown Sheet & Tube Co. in Chicago District

Youngstown, Sept. 30.—Confirmation of a Chicago dispatch that the Youngstown Sheet & Tube Co. contemplates erection of additional sheet making capacity in the Chicago district is lacking here. It is stated at the company's principal executive offices that no expansion of this kind is under consideration at the present time.

However, the Sheet & Tube company has been developing a program for the rounding out of finishing capacity of its properties in the Chicago territory, acquired from the Steel & Tube Co. of America. Work of rearranging and modernizing the existing units has been under way for the past year. Two new buttweld tube mills were added this year and a blast furnace is under construction.

It is not unlikely the company will give early thought to the creation of sheet capacity at Chicago, especially in view of the somewhat complicated pricing situation which has arisen, tending to localize quotations.

Industrial leaders in this district point out the wisdom of the Sheet & Tube company's policy in acquiring producing capacity at Chicago is more fully demonstrated in the abandonment of the Pittsburgh base.

During the week ended Sept. 13 the freight car movement in the United States is given by the American Railway Association at 1,061,424 cars, an increase of 140,445 cars over the previous week, which included Labor Day. This is the highest figure for the second week in September in the history of American railroads, being an increase of 861 cars over the high figure of last year.

A feature of a conveyor installation for the power plant and coal handling equipment of the North Carolina State College at Raleigh designed by the Stearns Conveyor Co., Cleveland, is that the chains of the conveyor are fitted with Alemite lubricating nipples. It is claimed that the application of the Alemite system lengthens the life of the chain and provides for easy and inexpensive lubrication.

Iron and Steel Markets

PRICE UNCERTAINTIES

Consumers of Steel Disturbed by Plural Basing

Ten Per Cent Gain in Pig Iron Output—Railroad Buying Still the Largest Factor

Adjustment to the new price bases still overshadows all else in the steel market; but buying has been on a larger scale than in the preceding week, due chiefly to the further expansion of railroad demand covering products like rails, plates, shapes and bars, which are little affected by the change.

While the Steel Corporation was prompt in putting out its new price schedules for wire, sheets and pipe, actual sales in these products have not been in such volume as to determine the competitive lineup. Chicago district buyers get \$3.80 a ton concession from former prices on sheets and wire and \$4 a ton on pipe; but in their adjustments to the new régime both the Steel Corporation and independent producers start with the prices that have prevailed in recent weeks.

Some consumers are disturbed by advantages their competitors will have through plural basing in wire, sheets and pipe. The localizing of operations of various independent steel producers was at first dwelt upon as an effect of the new system, but a similar localizing of the business of certain manufacturing buyers of steel is now having more attention.

Very largely, independent steel companies are quoting delivered prices, and Pittsburgh basing is still used even by mills in other districts. One of the uncertainties in this connection is what steps the Federal Trade Commission will take to make its order compulsory on the entire trade.

One of the current predictions is that the railroads will be losers by the abolition of Pittsburgh basing, since it will multiply short hauls on steel and cut down the profitable long haul business.

An unexpected turn in the situation is the probability that Pittsburgh district producers will ask for a reduction in freight rates that will permit them to serve a wider field as basing points increase

New orders booked by the Steel Corporation in September exceeded those for August. Most independent companies took on somewhat less new business in September than in August. While the Steel Corporation is now running at about 63 per cent of capacity, the average for independents is 55 per cent or less.

A further increase in the Steel Corporation's unfilled orders is indicated. While September shipments were more than those of August, quarterly contracts for sheet bars and billets swell September orders.

Another September item is an order for 1,-600,000 boxes of tin plate, 80,000 tons, placed with the Steel Corporation for shipment this year to the Pacific Coast and Hawaiian plants of the American Can Co.

Railroad car buying is expected to gain momentum this month as 40,000 cars are being tentatively figured on, including 10,000 for the Santa Fe, 8000 for the Baltimore & Ohio, 3000 for the Atlantic Coast Line, 2500 for the Chicago & Northwestern and 2050 for the Great Northern. The Reading has ordered 2000 and may buy 1000 more this week. The Missouri Pacific has ordered 50 locomotives and the New York Central is figuring on 15 to 40.

The large rail order of the New York Central is about to be given out, and the Baltimore & Ohio inquiry is put at 60,000 tons. The Illinois Central has just added 15,000 tons to its recent contract for 60,000 tons.

Following the substantial reduction in wire products at Chicago there has been better buying, due in part to the improvement in agricultural demand.

Quite apart from the recasting of basing prices, there are evidences of sharp competition for current business in both finished and semi-finished lines. A 20,000-ton sale of sheet bars is reported at \$35, Pittsburgh.

Pig iron production in September, following the upward turn in August, gained 10 per cent in the daily rate: Returns wired on Sept. 30, the last day of the month being estimated, showed a total of 2,016,275 tons, or 67,209 tons a day, against 1,887,-145 tons in August, or 60,875 tons a day.

So far as reported, the net gain in active furnaces was 21 in September, 172 furnaces being in blast at the end of the month, compared with 151 on Sept. 1. The Steel Corporation gained 5, the independent steel companies 12 and the merchant producers 4.

Shipments of pig iron last month exceeded production, notably in Chicago and Philadelphia districts. Buying has not been up to expectations in leading centers, and October opens with very little activity, the dullness being attributed largely to the unsettled price conditions in the finished steel market. Recent buying has been confined mainly to cast iron pipe and railroad companies.

Pittsburgh

Large Order for Tin Plate—Freight Rate Agitation Expected

PITTSBURGH, Sept. 30.—September has not done as well as the previous month in point of steel business and unless there is a material quickening in the demand in the next few weeks, October production will be on a smaller scale than for month ending today. Already there has been some recession in ingot production in the Youngstown district and locally and elsewhere in the Pittsburgh district, steel works activities are about holding their own. September scarcely had opened before there were signs of some abatement from the August activity, and in the past two weeks the change from the Pittsburgh plus method of quoting has encouraged buyers to hold back until they could see where

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton: 1924 1924 1924 1924 1924 1922 No. 2X. Philadelphia; \$21.76 \$21.76 \$24.76 \$24.76 \$24.50 \$24.50 \$24.50 \$24.50 \$24.50 \$24.50 \$24.50 \$24.50 \$25.05 \$25.05 \$25.05 \$25.05 \$25.05 \$25.05 \$25.05 \$25.05 \$25.05 \$25.05 \$25.00 \$20.00 \$26.0	Sheets, Nails and Wire, Sept. 30, Sept. 23, Sept. 2, 1923 Oct. 2, 1924 1924 1924 1923 Per Lb. to Large Buyers: Cents Cents Cents Cents Cents Cents Sheets, black, No. 28, P'gh. 3.50 3.50 3.50 3.50 3.75 Sheets, galv., No. 28, P'gh. 4.60 4.60 4.60 5.00 5.00 Sheets, blue, 9 & 10 P'gh. 2.76 2.70 2.65 3.00 Wire nails, Pittsburgh. 2.50 2.50 2.55 2.75 Barbed wire, galv., P'gh. 3.45 3.45 3.50 3.80 Tin plate, 100-lb. box, P'gh. 35.50 35.50 \$5.50 Old Material, Per Gross Ton:
Ferromanganese, furnace. 95.00 95.00 95.00 110.00 Rails, Billets, Etc., Per Gross Ton: Oh. rails, heavy, at mill. \$43.00 \$43.00 \$43.00 \$43.00 Oh. billets, Pittsburgh. 36.00 36.00 37.00 40.00 Oh. billets, Pittsburgh. 36.00 36.00 37.00 40.00 Oh. sheet bars, P'gh. 37.00 37.00 37.50 42.50 Forging billets, base, P'gh. 42.00 42.00 47.50 Oh. billets, Phila. 41.17 41.17 42.17 45.17 Wire rods, Pittsburgh. 46.00 46.00 51.00 Wire rods, Pittsburgh. 46.00 Cents Skelp, gr. steel, P'gh, lb. 2.00 2.00 2.00 2.40 Light rails at mill. 1.85 1.85 2.15	Carwheels, Chicago \$18.00 \$18.50 \$18.00 \$19.00 Carwheels, Philadelphia 18.00 18.00 18.00 20.50 Heavy steel scrap, P'gh 18.00 18.50 17.50 16.50 Heavy steel scrap, Phila 17.00 17.00 17.00 16.00 Heavy steel scrap, Ch'go 16.50 16.50 16.00 15.00 No. 1 cast, Pittsburgh 18.00 18.00 18.00 21.00 No. 1 cast, Ch'go (net ton) 18.00 18.00 18.00 20.50 No. 1 cast, Ch'go (net ton) 18.00 18.00 19.00 No. 1 RR. wrot. Phila 19.00 19.00 19.00 19.00 No. 1 RR. wrot. Ch'go (net) 15.00 15.00 14.00 14.50
Finished Iron and Steel, Per Lb. to Large Buyers: Cents Cents Cents Iron bars, Philadelphia. 2.32 2.32 2.32 2.67 Iron bars, Chicago. 2.10 2.15 2.15 2.35 Steel bars, Chicago. 2.00 2.00 2.10 2.40 Steel bars, Chicago. 2.00 2.00 2.10 2.50 Steel bars, New York. 2.34 2.34 2.44 2.74 Tank plates, Pittsburgh. 1.80 1.80 1.90 2.50 Tank plates, Pittsburgh. 1.80 1.80 1.90 2.50 Tank plates, Chicago. 2.00 2.00 2.10 2.60 Tank plates, New York. 1.94 1.94 2.09 2.84 Beams, Pittsburgh. 2.00 2.00 2.00 2.00 2.50 Beams, Chicago. 2.00 2.00 2.00 2.50 Beams, Pittsburgh. 2.50 2.60 2.60 3.00 *The average switching charge for delivery to foundries in the Chicago district is 61c. per ton. †Silicon, 1.75 to 2.25. \$Silicon, 2.25 to 2.75.	Coke, Connellsville,

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market report on other pages.

THE IRON AGE Composite Prices

Sept. 30, 1924, Finished Steel, 2.474c. Per Lb.

plain wire, open-hearth rails, black pipe and black sheets. These products constitute 88 per cent of the United States output of finished steel.	2.510c. 2.775c. 1.689c.
Sept. 30, 1924, Pig Iron, \$19.46 Per Gross Ton	
Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham. Sept. 23, 1924, Sept. 2, 1924, Oct. 2, 1923, Philadelphia and Birmingham.	\$19.46 19.46 23.96 15.72
1924 to Date High 2.789c., Jan. 15.	Jan 2

they could buy cheapest as a result of the new alinement.

Based on prices of steel bars, beams, tank plates,

In spite of these conditions, however, it is reasonably safe to predict that the unfilled tonnage statement of the Steel Corporation for September will show another increase, because in the past week that interest booked 80,000 tons of tin plate, and orders for rails and railroad equipment are expected to more than offset some decrease in pipe bookings.

While the new mode of quoting has become practically established so far as pipe and wire products are concerned, there is not the same degree of certainty as to the plans for marketing sheets, notwithstanding that the leading producer of the latter has established Pittsburgh district and Chicago district bases. Since the

announcement of the Steel Corporation on Sept. 18 of its intention to comply with the order of the Federal Trade Commission in the matter of Pittsburgh basing, it seems that there has been much more discussion of the conditions likely to be created by that development than there has been about the steel business itself. Pittsburgh steel manufacturers do not concede that the district has lost or is likely to lose its "place in the sun." Mills located outside of the district have profited much more than those within it from the Pittsburgh plus method of quoting and the claim is made here that the railroads will be the chief losers by the change, which will mean the multiplying of short hauls at the expense of the profitable long distance hauls.

Sept. 23, 1924, 2.474c.

Attention now is being directed toward freight rates

from Pittsburgh, and as there is a very general idea that Pittsburgh is at a disadvantage as compared with a number of other producing centers, it may be put down as a certainty that some time within the near future a movement will be started seeking more equitable rates from Pittsburgh that will make possible the serving of a wider field than present tariffs permit.

Outside of the setting up of new basing points, there have been few price changes, but these have indicated that the trend of the market still is downward. Automobile body sheets, at \$5.35 base at the beginning of the year, which later fell to \$5.10 base and then in quick succession to 5c. and 4.75c., have gone to 4.60c. in the past week, making the year's decline a matter of \$15 a ton.

With Cleveland prices of cold-rolled strips and cold finished steel bars the same base as Pittsburgh, there is doubt that the Pittsburgh price can be maintained in view of freight differentials. Already there is a demand on the part of local makers of cold-finished steel bars for lower prices on hot-rolled bars to enable them to compete in the Cleveland district, as important, if not the most important, consuming point for screw stock bars.

Activity is lacking in the pig iron market. Mill buying of scrap has practically ceased and dealers who are short of the market are not exerting themselves to give prices support through purchases. Increased demand for coal has been met by increased production and prices are no stronger than they have been. The coke market likewise favors buyers.

Pig Iron.—It is doubtful if the total business of the past week has amounted to as much as 2000 tons. Sales have been running entirely in lots of a carload to 100 tons and the demand reflects a tendency on the part of melters merely to buy what they must have. While \$20 furnace still is asked by a number of producers for No. 2 foundry, \$19.50 Valley furnace appears to be as high as any business has been done in the Pittsburgh district. A Valley furnace interest reports sales aggregating 1000 tons at the higher figure, but the iron went to consumers having a lower rate of freight than the one to Pittsburgh. Small lots of Bessemer iron have been moved at \$20, Valley furnace. A sale of 100 tons of iron called Bessemer, but in reality of malleable analysis, recently was made at \$20.89, delivered this district, or \$19 back at the furnace in eastern Ohio.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being \$1.76 per gross ton:

Basic \$1	19.00
	20.00
Gray forge	
No. 2 foundry 19.50 to	00.00
No. 3 foundry 19,00 to	9.50
Malleable	19.50
Low phosphorus, copper free 27.00 to 5	8.00

Ferroalloys .- Suggestions, emanating from British sources, are heard of the possibility of higher prices at no distant date for ferromanganese, but it is extremely doubtful whether an attempt to obtain higher prices for British material, if made just now, would be any more successful than that of the leading domestic producer, which for three weeks has been quoting \$100, Atlantic seaboard, without making any sales. There does not appear to be any British ferromanganese available at less than \$95, Atlantic seaboard, but sales at that price are few and small, as sales at that price or less a short time ago amounted to 18,000 tons, and will meet the requirements of most users for at least the remainder of this year, especially as steel works operations are decreasing instead of moving in the other direction. Interest in 50 per cent ferrosilicon is small. Fair demand is noted for spiegeleisen at unchanged prices; we note one sale of 500 tons of a Pittsburgh district consumer at \$31, furnace, for 20 per cent alloy. For smaller lots the price ranges \$1 to \$2 a ton higher. Prices are given on page 887.

Semi-Finished Steel.—Wire rods have been established at \$46, base, Pittsburgh or Cleveland, and \$48,

base, Chicago, by the American Steel & Wire Co. and independent companies are naming the same prices. There is no reason to change Pittsburgh district mill prices on billets, slabs, sheet bars and forging billets. The common asking price on billets and slabs is \$37 and on sheet bars \$37.50, but there have been sales of billets at \$36 and sheet bars are not hard to get at \$37. On forging billets a fair appraisal of the market would be \$41 to \$42. There is not much open market activity, but fairly good specifications against contracts. Prices are given on page 887.

Wire Products.—Base prices of \$2.50 per 100 lb., Pittsburgh or Cleveland, for wire and \$2.75 per keg and differentials for other producing districts recently set up by the American Steel & Wire Co., have been adopted by leading independent producers and the transition from a sole Pittsburgh basing to the new order is practically completed. Fairly good business is being done, but there is still a lack of forward buying and mills are having some trouble in accumulating backlogs and are well abreast of their obligations. Prices are given on page 886.

Steel Rails.—Demand for light rails still is limited and while quotations are unchanged they are really untested. There is no question that lower prices have been and still can be done on worth while tonnages. Prices are given on page 886.

Tubular Goods .- Good demand is noted for merchant pipe, but activity is lacking in oil country goods and no new line pipe inquiries of importance are now before makers. Report that the Prairie Oil & Gas Co. was in the market for a line is premature; this company is figuring on such a line, but has not yet made formal inquiry for the pipe. Inquiry of the Andean National Corporation for 365 miles of 10-in. pipe for a line in South America has been shelved for the time being. The inquiry called for American Petroleum Institute specifications, which have not been adopted by manufacturers, and the company would not pay the extra prices demanded for conforming to the specifica-The steel pipe price situation is dwelt upon at length elsewhere in this issue. Boiler tube prices are as weak as ever. As many as 5 fives beyond the cards are being given in the effort to secure lap-welded steel and charcoal iron boiler tubes. Discounts are given on page 886.

Sheets.-The American Sheet & Tin Plate Co. has announced Gary, Ind., basings on black, galvanized and blue annealed sheets, these being the only finishes made by the company at that plant. The new bases are 3.60c. for black, 4.70c. for galvanized and 2.80c. for blue annealed, f.o.b. Gary, or 5c. per 100 lb. more delivered Chicago, to consumers having railroad sidings. company still is quoting 3.50c., base, Pittsburgh district mills, for black, 4.60c. for galvanized and 2.70c. for blue annealed. It is quoting automobile body sheets 4.60c., base (22 gage), Pittsburgh district mills, meeting a cut made last week by several independent This setting up of Chicago and Pittsburgh makers. bases by the leading interest has not clarified the situation materially as yet and most independent companies still are on a Pittsburgh base, or its equivalent in a delivered price. It is claimed that the Chicago base prices keep out the Eastern independent mills from that district, but there is no positive assertion that the price will not be met by independents. Sheet business appears to have gained in the West, but is not as good with local mills as it was recently and mill operations are lighter for this and nearby districts, averaging about 63 per cent. The American Sheet & Tin Plate Co. last week averaged 70 per cent of capacity operations and will do about the same this week, its schedules being helped by the recent Argentine galvanized sheet order amounting to close to 40,000 tons. Prices are given on page 886.

Tin Plate.—The American Sheet & Tin Plate Co. has just taken an order for 1,600,000 boxes for shipment over the remainder of the year, to go to the Pacific Coast and Hawaii, specifications for half of which already have been received. The company already is producing against the order. Independent

makers have not yet given any indication as to whether they will follow the Chicago district base of \$5.60, recently announced by the American Sheet & Tin Plate Co. Those in this district still are quoting \$5.50 per base box, Pittsburgh, and that is the price of the leading interest so far as Pittsburgh district mills are concerned.

Cold-Finished Steel Bars.—Makers in this district are disturbed by the naming of a Cleveland base of 2.70c. by the American Steel & Wire Co. This means taking much less than 2.70c., base, Pittsburgh, to get into the Cleveland district, and that is important consuming territory, particularly on screw stock, for local producers. Setting up of a Worcester base of 2.85c. by the same company also threatens to cut off some business for Pittsburgh makers, since the freight to New England from Pittsburgh is 36½c. per 100 lb. September was a month of good shipment for local makers, notably to the automobile parts makers and there is expectation of continued good demand from that source. Ground shafting remains at 3.20c., base, f.o.b. mill for lots of a carload or more.

Hot-Rolled Flats.—No particular change is noted in the price situation; in this and nearby districts makers generally are holding to a Pittsburgh base and quoting 2.50c. to 2.60c., base, for hoop sizes, 2.40c. to 2.50c. for band sizes and from 2.25c. to 2.40c., according to width, for strips. General business is fair, but there are few makers who could not take on more. Prices are given on page 886.

Cold-Rolled Strips.—Independent makers in this district have not yet followed the American Steel & Wire Co. in naming a base of 4c. at Cleveland and 4.15c. at Worcester, Mass., but it is admitted that to get into those territories they must meet the price. In the past both points have drawn upon Pittsburgh for much tonnage, but the impression now is that business not only in those districts will become localized and go to the mill or mills making the lowest delivered prices. In this district 4c., base, appears well established.

Iron and Steel Bars.—The range on soft steel bars still is 2c. to 2.10c. base, from Pittsburgh district mills, the higher figure applying on small lot tonnages and the lower one to larger tonnages. Mills in this district, however, can not go very far beyond their natural territory and get more than 2c. On reinforcing bars, the market now is down to 2c. base Pittsburgh district mills for small tonnages. On refined iron bars, local makers are holding to 2.90c. to 3c. base and report a fair demand at that level. Prices are given on page 886.

Structural Material.—Mills in the Pittsburgh district continue to hold at 2c. base for large structural shapes and on such business as is coming out in the region within which freight rates are favorable that is the prevailing price. Demand is not particularly brisk because fabricating shops in this district are not getting new business as rapidly as they are working through old jobs. Plain material prices are given on page 886.

Bolts, Nuts and Rivets.—Suggestions of a revolt of bolt, nut and rivet makers over the action of the Steel Corporation in abandoning the Pittsburgh basing point method of quoting are not borne out by the facts. Local makers are quoting f.o.b. Pittsburgh. Cleveland makers have partially adopted an f.o.b. Cleveland base and Chicago for some time has had a separate basing. The f.o.b. Cleveland base applies only on local business for the present and the Pittsburgh base is being observed on business east and west. Pittsburgh prices are unchanged, but business is not as good as it was recently. Prices and discounts are given on page 886.

Track Supplies.—Business still is quiet with local producers. The change from a Pittsburgh plus basis of quoting is expected to localize business, but will also have the effect of bringing to local plants business of local jobbers which often has gone to outside makers. Prices are given on page 886.

Plates.—The prevailing price in this immediate territory is 1.90c. base, Pittsburgh district mills, but sales at that figure embrace only small tonnages. In competitive territory, Pittsburgh district mills have gone as

low as 1.80c. on desirable business. Prices are given on page 886.

Coal and Coke.—Recent coke prices on both furnace and foundry grades are holding, due to the fact that supply and demand are practically equal. On the spot furnace coke or for a tonnage of shipment over a period of two weeks to a month, the market is quotable at \$3 per net ton at ovens. For a longer period of deliveries, the common asking price is \$3.25. Foundry grades hold at \$4 to \$4.50 per net ton at ovens for spot prompt shipment. Improved demand for coal looked upon as merely seasonable and as production has increased it has been impossible to put up prices, Slack coal is something of a drug on the market and prices are weak, with steam slack at \$1 to \$1.10 per net ton at mines and gas slack from \$1.15 to \$1.30. Mine run steam coal still is quotable at \$1.50 to \$2.10. Coking coal from \$1.60 to \$1.85 and gas coal from \$2 to \$2.25.

Old Materials.-Occasion does not exist for mate rial changes in prices from those of a week ago. buying is very light and about the only demand in the market is that from dealers who went short against recent sales. Recent buyers are very exacting as to quality and a good many rejections are reported, more especially against the higher priced material. Mills to which the rejected material is being shipped are getting some cheap supplies. An appraisal of today's market on heavy melting steel is \$18 to \$18.50, as that is all that dealers would pay and probably all that mills would pay for pickup tonnages. A large tonnage no doubt would command a higher price, but there are no such inquiries and none seem imminent in view of the fact that steel works operations are dropping in some local districts. The Pennsylvania Railroad is taking bids until 11 a. m. Oct. 1 on 42,834 net tons of old material and 15 old locomotives and tenders "as is," shipping instruction to be furnished in 10 days.

We quote for delivery to consumers' mill in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

Per Gross Ton			
Heavy melting steel	18.00	to	\$18.50
No. 1 cast, cupola size			
Rails for rolling, Newark and			
Cambridge, Ohio; Cumberland,			
Md.; Huntington, W. Va., and			
Franklin, Pa.	19,50		20.50
Compressed sheet steel	16.50		17.00
Bundled sheets, sides and ends	15.00		15.50
Railroad knuckles and couplers Railroad coil and leaf spring	21.00		22.00
Low phosphorus blooms and bil-	21.00	to	22.00
let ends	23.00	10	23.50
Low phosphorus plate and other	20.00	20	WA'5A
material	22.00	to	22.50
Railroad malleable	16.50	to	17.00
Steel car axles	23.00	to	23.50
Cast fron wheels	18.50		19.00
Rolled steel wheels	31.00		22.00
Machine shop turnings	14.50		15.00
Sheet bar crops	22.00		22.50
Heavy steel axle turnings	15.50	to	16.00
Short shoveling turnings	16.00	-	16.50
Stove plate	15.00		15.50
Cast iron borings	10.00	60	15.00
No. 1 railroad wrought	16.00	to	
No. 2 railroad wrought	18.50		19.00
Title a seminar windeling tittitit		-	

Exports of anthracite coal from the United States in the eight months ended Aug. 31 were 2,299,741 tons, valued at \$25,407,433, or an average of \$11.05 per ton. Exports of bituminous coal during the same period amounted to 10,155,679 tons, valued at \$48,046,475, or an average of \$4.73 per ton. Exports of coke during the same eight months amounted to 377,608 tons, valued at \$3,271,396, or an average of \$8.66 per ton. In each of the three cases the amount and the total value were less than for the corresponding period of last year.

The Youngstown Sheet & Tube Co. has started Grace blast furnace in its Brier Hill group, giving it five active stacks of nine in the Youngstown district. At Chicago, the Sheet & Tube company is operating three of its nine blast furnaces. Resumption of Grace stack gives the Youngstown district 21 active blast furnaces, of 45, the active stacks representing fully 65 per cent of gross iron output of the district.

Chicago

Independents Changing Sales Policies to Conform to New Conditions

CHICAGO, Sept. 30.—The finished steel market is still in the throes of adjustment following the abandonment of Pittsburgh basing by the Steel Corporation subsidiaries. Such action as has been taken thus far by independent mills indicates that they are accepting the changed situation and are altering their sales policies to conform with it. The Youngstown Sheet & Tube Co., the only company now producing pipe in the Chicago area, has established base prices at its Evanston, Ill., and Indian Harbor, Ind., mills, which are approximately \$4 a ton higher than the quotations at Lorain and Pittsburgh. It has likewise announced Chicago delivered prices which are \$1 higher than Chicago district mill prices to take care of freight charges. It is the consensus of opinion that these new quotations will be met by both other independent mills and by the Steel Corporation subsidiaries, although the latter's Gary plant will not get into production until next year.

The Inland Steel Co., the only independent producer of sheets in the vicinity of Chicago, has announced Chicago delivered prices on black, galvanized and blue annealed sheets which are identical with those established last week by the American Sheet & Tin Plate Co. The Inland company has not announced an f.o.b. mill price, but, no matter what the location of the consumer, will quote a delivered price in each case.

On tin plate the American Sheet & Tinplate Co. has established a price at Gary, Ind., which is 10c. higher than the price at Pittsburgh, or \$5.60 per base box for standard cokes. The delivered price at Chicago will be 5c. higher, as is also the case with sheets. On cold-rolled strip, the American Steel & Wire Co. has established a base price of 4c. per lb., Cleveland, or the equivalent of 4.30c., delivered Chicago. This figure is being met by the local independent producers.

An interesting result of the price adjustment is the fact that some of the independents located east of here are meeting the new Chicago delivered prices of wire products and sheets. The Pittsburgh Steel Co. and the Jones & Laughlin Steel Corporation have done so on wire products and an important independent sheet mill has taken the same action on sheets. To what extent independents as a whole will absorb the freight to retain their trade in this territory is still uncertain and will no doubt depend on various considerations.

Those companies which contemplate constructing western branch plants in the Chicago district will obviously find it worth while to make concessions to hold their business in this section. Those mills which have sufficiently large outlets for their products in other directions may decide to remain out of this market. At any rate, it is a decided reversal of conditions to find that producers who under the Pittsburgh base plan sold at delivered prices including the full freight from Pittsburgh, which in their case is actual freight, now are conceding part of this freight to western con-

Pig Iron.—September buying fell behind that of August, but shipments were 20 per cent heavier than in August. At the moment the market is inactive, purchases being confined largely to small lots for prompt shipment. The increase in spot business, however, is regarded as indicative of increased melt, although in some cases it may represent a precautionary policy to protect plants against possible transportation difficulties. Railroad service has been exceptionally good and for that reason melters have been working on very low stocks, but the heavy grain traffic with the fall coal movement coming on may portend transportation delays later in the year. An implement manu-

facturer has closed for 3300 tons of malleable and foundry, part of it for first quarter delivery. A Michigan user has placed 1000 tons of malleable, all of it for first quarter. These were the outstanding sales of the week, others ranging from 500 tons each down to carload lots. The ruling market on local iron remains \$20.50, base furnace, and sales at \$21, base, are confined to scattered carload lots.

Quotations on Northern foundry, high phosphorus, malleable and basic iron are f.o.b. local furnaces and do not include an average switching charge of 61c. per ton. Other prices are for iron delivered at consumers' yards.

Northern No. 2 Foundry, sil. 1.75		
to 2.25	\$20.50 to	\$21.00
Northern No. 1 foundry, sil. 2.25		
to 2.75		
Malleable, not over 2.25 sil		
Basic		20.50
High phosphorus		20.50
Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago		29.04
Southern No. 2 (barge and rail)		22.18
Southern No. 2, sil. 1.75 to 2.25	99 51 to	
Low phos., sil. 1 to 2 per cent,	20.01 (0	24.01
copper free		31.79
Silvery, sil. 8 per cent	34.29 to	
Electric ferrosilicon, 14 to 16 per	0 2100 00	00.00
cent		43.42

Ferroalloys.—We note sales of 500 tons and 200 tons of ferromanganese respectively at \$95 seaboard. Certain domestic producers have advanced to \$100, but foreign material is still available at the lower price. The Zenith furnace at Duluth is scheduled to be blown in this week.

We quote 80 per cent ferromanganese, \$102.56 delivered; 50 per cent ferrosilicon, \$75, dlivered spiegeleisen, 18 to 22 per cent, \$40.56, delivered.

Plates.—Railroad buying is looming up as a more and more important factor in the market. Orders for freight cars placed this month aggregate nearly 23,000 and pending inquiries call for 26,000 additional cars, most of them for Western roads. The carriers are also entering the market for material on their own account, the New York Central having asked for bids on plates, shapes, bars, billets, axles and steel wheels for last quarter delivery. Fabricators of oil storage tanks continue to buy considerable steel, although there are few large tank projects in the market. Numerous small tank lettings, however, form a substantial aggregate. A local mill has booked 4000 tons of plates from a tank builder during the week.

The mill quotation is 2c. to 2.15c., Chicago. Jobbers quote 3.10c. for plates out of stock.

Structural Material.—Fabricating awards for the week total 40,500 tons, of which 2500 tons is for the Standard Club Building. While a number of Western fabricators are now heavily booked, there are others who are still hungry for business with the result that current bids are still low. Mill bookings in plain material are the largest since last March. Plain material prices show no particular change.

The mill quotation on plain material is 2c. to 2.15c., Chicago. Jobbers quote 3.10c. for plain material out of warehouse.

Wire Products.—The establishment of independent

Western basing points on common products has cleared the atmosphere and all indications point to heavier specifications from jobbers. Chicago delivered prices on wire and nails are now \$4.80 a ton lower than two weeks ago. Of this amount, \$3.80 is accounted for by the fact that the price for Chicago delivery has been fixed at \$3 above the prices at Pittsburgh and at Cleveland, which are now on a parity, while one dollar is accounted for by a reduction of 5c. per 100 lb. in the prices at the latter two points from the former Pittsburgh base quotations. In view of this substantial reduction, Western buyers are no longer delaying purchases because of price considerations. more, their actual needs are steadily increasing through the improvement in agricultural sections. Prices on woven fence at Pittsburgh and Cleveland remain the same as the former Pittsburgh base prices, while quotations delivered at Chicago are equivalent to \$3 per ton higher. The usual spring terms on fence allowing orders to be placed now for March 1 dating, have been offered and business is being booked on that basis. Western independent mills are meeting the new Wire nails prices of the American Steel & Wire Co. are \$2.90 per keg delivered, Chicago, and \$2.85 f.o.b. Chicago district mills; No. 9 bright plain wire is \$2.65

per 100 lb. delivered, Chicago, and \$2.60 f.o.b. Chicago district mills.

We quote warehouse prices f.o.b. Chicago: No. 5 black annealed, \$3.05 per 100 lb.; common wire nails \$3.15 per 100 lb.; cement coated nails, \$2.40 per keg.

Bars .- Consumers of bar mill products are exerting increasing pressure for material with the consequence that soft steel bar specifications for September are much heavier than those received in August. liberal releases from bolt, nut and rivet manufacturers indicate that their activities are steadily expanding.

Mill prices are: Mild steel bars, 2c. to 2.10c.; common bar iron, 2.10c. to 2.15c., Chicago; rail steel, 2c., Chicago mill.

Jobbers quote 3c, for steel bars out of warehouse. The warehouse quotations on cold-rolled steel bars and shafting are 3.80c. for rounds and 4.30c. for for bands.

Jobbers quote hard and medium deformed steel bars at 2.15c. to 2.20c.

Rails and Track Supplies.—The Illinois Central, which recently distributed orders for 60,000 tons of rails between the Inland, Gary and Tennessee mills, has placed 15,000 tons additional, bringing its total purchases up to 75,000 tons. Of this aggregate, 60,000 tons will be rolled by the Steel Corporation subsidiaries.

Standard Bessemer and open-hearth rails, \$43; light rails, rolled from billets, 1.80c. to 1.90c., f.o.b. makers' mill.

Standard railroad spikes, 2.80c. to 3c. mill; track bolts with square nuts, 3.80c. to 4c. mill; steel tie plates, 2.45c., f.o.b. mill; angle bars, 2.75c. f.o.b. mill.

Jobbers quote standard spikes out of warehouse at 3.45c. base, and track bolts, 4.45c base

Bolts and Nuts .- Third quarter specifications are very heavy as fourth quarter approaches. There has been little new buying as yet at the advanced quotations, however.

Jobbers quote structural rivets, 3.65c.; boiler rivets, 3.85c.; machine boits up to $\frac{4}{5}$ x 4 in., 60 per cent off; larger sizes, 60 off; carriage boits up to $\frac{4}{5}$ x 6 in., 55 off; larger sizes, 55 off; hot pressed nuts, squares and hexagons, tapped, \$4 off; blank nuts, \$4 off; coach or lag screws, gimlet points, square head, 65 per cent off.

Cast Iron Pipe.—This is the season of the year when the market usually enters a period of reduced demand which terminates in mid-winter with the release of spring purchases by the larger municipalities. By contrast with a year ago, however, the situation is encouraging as fully 25,000 tons of municipal work is now in prospect as compared with a negligible tonnage which was in sight then. While pipe shops are comfor tably booked, they would welcome additional tonnage for the coming three-month period. Their attitude is reflected in prices which now range from \$42 to \$43, base Birmingham, on 6-inch and larger. The United States Cast Iron Pipe & Foundry Co. has been awarded 2500 tons for Detroit and 610 tons for Oakland City, Ind. St. Paul has placed 200 tons with the National Cast Iron Pipe Co. The National company has also booked 225 tons for the Medinah Country Club, near Chicago, and is low bidder on 700 tons for the city of Chicago.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., \$54.20 to \$55.20; 6-in. and over, \$50.20 to \$51.20; Class A and gas pipe, \$5 extra.

Plates, Shapes, Bars and Rails.—These products

were not affected by the recent change in price basings and are in increasing demand. Inquiries are the heaviest in two years and bookings for September were 100 per cent heavier than in August. This expansion in business is accounted for, in large part, by railroad purchases. Orders for freight equipment thus far placed in September and still to be distributed in October are expected to exceed 60,000 cars. Rail buying is developing less rapidly, but the Illinois Central which recently ordered 60,000 tons, has placed 15,000 tons additional of which 8000 tons went to the Illinois Steel Co., 4000 tons to the Inland Steel Co., and 3000 tons to the Tennessee Coal, Iron & Railroad Co. Local mill operations continue to improve.

Sheets.-Western buyers have been placing liberal orders with Chicago district producers and one Western mill is now operating at capacity. The prices announced last week by the American Sheet & Tin Plate Co. of 2.85c. base, delivered Chicago, for blue annealed, 4.75c. for galvanized and 3.65c. for black, have been met by the Inland Steel Co., which will quote delivered prices to all consumers whether located in Chicago or elsewhere. An interesting development is the decision of an important producer east of here to meet the new Chicago delivered prices.

Reinforcing Bars. -Although there is still a propensity to delay purchases of reinforcing steel, awards for the current week are more liberal than for some time. Apparently a portion of the trade, at least, has come to the conclusion that the steel market cannot continue to decline indefinitely and that it is well to place business before the situation changes. The American System of Reinforcing is low bidder on 1700 tons for the Snelling-Mendota bridge, Minneapolis. Current warehouse quotations range from 2.15c. to 2.20c., Chicago, while lower prices have been made for mill shipment.

Lettings include:

Roosevelt Junior High School at Milwaukee, 275 tons to Kalman Steel Co.

Municipal water storage reservoir at Eau Claire, Wis., 200 tons to Concrete Engineering Co.

Franklin Street Garage building, Chicago, 500 tons of rail steel to Inland Steel Co.

Public school building, Milwaukee, Wis., 275 tons to Kalman Steel Co.

Sanitary District of Chicago, section of McCormick Road, 200 tons to Concrete Steel Co.

Plankinton Arcade Building, Milwaukee, 185 tons to Kalman Steel Co.

Pending business includes:

Additional steel for Snelling-Mendota Bridge, Minneapolis, 1700 tons, American System of Reinforcing, low bidder.

Jackson Tower Building, Chicago, 650 tons, Longacre Construction Co., general contractor.

Studio, storage and repair building for Chicago Civic era Co., Chicago, 200 tons, Graham, Anderson, Probst & Opera Co., White, architects

Old Material.—Notwithstanding additional independent mill purchases of fully 8000 tons of heavy melting at \$17 per gross ton delivered, consumer buying has been generally inactive and the price situation is weaker, although relatively few grades have actually As to the future course of the market, much declined. stress is laid on the attitude of the Steel Corporation plants. If liberal orders are forthcoming from that source, further advances in the market are likely to follow; if not, the trend of prices is uncertain. It is pointed out that scrap has advanced rather steadily since the fore part of the year whereas both finished steel and pig iron are lower. The confidence of dealers has also been disturbed by present political uncertainty. Railroad offerings include the Pennsylvania, 40,000 tons; the Monon 600 tons; and the New York Central, the Big Four, Michigan Central and Erie blank lists.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton Per Net Tow

Iron angle and splice bars
Iron arch bars and transoms
Iron arch bars and transoms
Iron arc axles
Steel car axles
No. 1 busheling
Pipes and flues
No. 1 railroad wrought
No. 2 railroad wrought
No. 1 machinery cast
No. 1 agricultural cast
Locomotive tires, smooth
Stove plate
Grate bars
Brake shoes

New York

Pittsburgh May Still Be Basing Point for Many Mills in the East

New York, Sept. 30.—New York district sales offices of steel companies report that September business showed a fair gain over August and August was better than July, but the volume of demand throughout September was not fully up to expectations. The situation has been complicated in the past week by the uncertainty among both buyers and sellers as to just what effect the abandonment of Pittsburgh basing for steel products will have, but whether this uncertainty has resulted in the withholding of orders by consumers and jobbers is more or less guesswork. Certainly there has been no pronounced halt in buying, orders having been booked in the past week at about the same rate as in previous weeks of the month.

Delivered prices are not any lower so far as the trade in this district is concerned, there being not a single instance aside from the New England situation on wire products in which it can be said that the new plan has made the slightest difference as yet in actual costs to consumers and jobbers.

Unless the Bethlehem Steel Co. should take some action looking toward separate basing points from its mills, it appears as if the New York district will continue to look to Pittsburgh as its basing point for all of the products which are made there.

We quote for mill shipments, New York delivery, as follows: Soft steel bars, 2.34c. to 2.44c.; plates, 1.94c. to 2.04c.; structural shapes, 2.24c. to 2.34c.; bar iron, 2.34c.

Pig Iron.—The Pennsylvania Railroad has purchased 5000 tons for delivery at its Altoona plant, dividing the tonnage between two companies. Otherwise sales of the past week have been extremely small. The largest inquiry pending is from the Worthington Pump & Machinery Corporation for 4785 tons of foundry iron, ranging from No. 2 plain to as high as 4.25 silicon for December and first quarter delivery at four of the company's plants. The Draper Corporation, Hopedale, Mass., is in the market for 2000 tons for fourth quarter and January-February delivery. Prices are unchanged.

and January-February delivery. Prices are unchanged.

We quote delivered in the New York district as follows, having added to furnace price \$2.27 freight from eastern Pennsylvania, \$4.91 from Buffalo and \$5.44 from Virginia:

Ferroalloys.—Predictions are made that prices of the British product may soon go as high as \$100 and it is stated that one domestic producer is already asking that figure. Very little buying is now being done by consumers, their requirements for the last quarter being fairly well covered in the last buying movement. In the last week or so there have been sales of a few carload lots at \$95, seaboard basis. Demand for spiegeleisen is light at unchanged prices.

Warehouse Business.—Demand for structural material is holding up well and business as a whole seems to be at about the same rate as early in September. While with most sellers September was not much better than August, a few report a slight improvement. In some quarters it is felt that as a result of the elimination of the Pittsburgh base there will be some changes in the warehouse prices in this district. In the pipe trade, particularly, it is believed that a change in discounts will be made before long. Brass and copper products have been reduced %c. per lb. and in some cases ½c. per lb., out of stock. Black and galvanized sheets are quiet, the black still being inclined toward weakness. We quote prices on page 906.

Cast Iron Pipe.—Although 1923 was an unusually active year in the water pipe business, present demand is on a par with the same period of last year and pro-

ducers expect to maintain their present activity until The low bidder on the 6-in., 8-in. and 12-in. Jan. 1. water pipe for installation in the Bronx was the Melrose Construction Co., New York. We quote per net ton, f.o.b. New York, in carload lots, as follows: and larger, \$56.60 to \$57.60; 4-in. and 5-in., \$61.60 to \$62.60; 3-in., \$71.60 to \$72.60, with \$5 additional for Class A and gas pipe. Competition for soil pipe business continues keen and prices weak. makers continue to quote the current schedule of discounts, concessions of a few points are so easily obtainable as to justify a wider range of discounts. We quote discounts of both Northern and Southern makers, f.o.b. New York, as follows: 6-in., 45 to 481/4 per cent off list; heavy, 55 to 581/4 per cent off list.

Shapes and Plates.-The only notable price weakness is in structural shapes, which are none too firm at 1.90c., Pittsburgh basis, and in some instances \$1 a ton has been taken off this price. This weakness extends also to fabricated steel, there being keen competition for work by district fabricating shops despite the fact that most of them have two months or more of orders ahead. New work on which bids are asked include a new hotel for the site of the Savoy, Fifth Avenue and Fifty-ninth Street, which will require about 12,000 tons, and an office building to be erected at Madison Avenue and Fortieth Street, to take 3500 tons. Distribution of orders for 2000 cars by the Reading is the only freight car order of importance. The American Locomotive Co. has received an order for 35 locomotives from the Missouri Pacific. Plates continue weak, but prices are no lower, the range being 1.60c. to 1.65c., Pittsburgh, most of the Eastern mills continuing to quote on a Pittsburgh basis or on delivered prices with a Pittsburgh equivalent of 1.60c. or 1.65c. Steel bars are holding fairly well at 2c., Pittsburgh.

Coke.—A slight improvement in demand is noted in some quarters, but prices are unchanged at \$4.25 to \$4.75 per ton for standard foundry and \$3.25 to \$3.50 per ton for standard furnace. By-product is unchanged at \$10.41, Newark and Jersey City, N. J.

Old Material.-With the exception of cast borings, borings and turnings and machine shop turnings, prices are unsteady and inclined to weakness. This is particularly true of heavy melting steel, which is sluggish with suspension of shipment ordered by three eastern Pennsylvania consumers. The market price of No. 1 heavy melting steel of railroad quality is unchanged, however, at \$16.50 to \$17.50 per ton, the buying price, delivered to eastern Pennsylvania mills. Specification pipe is being bought at about \$15.50 per ton delivered to a Milton, Pa., consumer and \$16 per ton delivered to a user in Lebanon, Pa. Heavy breakable cast is weak as a result of the light demand. With \$13 per ton delivered being paid on cast borings, borings and turnings and machine shop turnings by dealers shipping to a consumer taking a low freight rate, these grades are quite steady. Forge fire is being purchased at \$14 per ton delivered to Coatesville. Stove plate is quiet with \$15 per ton delivered being offered by brokers shipping to a consumer taking a \$3.78 freight rate and \$14.50 per ton delivered offered for a consumer taking a \$2.02 freight rate.

Buying prices per gross ton New	York	fol	llow:
Heavy melting steel, yard Heavy melting steel, railroad or	\$13.00	to	\$13.50
equivalent	14.00	to	14.50
Rails for rolling	14.50	to	15.00
Relaying rails, nominal	24.00	to	25.00
Steel car axles	19.50	to	20.00
Iron car axles	26.00	to	28.00
No. 1 railroad wrought	14.50	to	15.00
Forge fire	10.00	to	10.50
No. 1 yard wrought, long	13.50	to	14.00
Cast borings (clean)	9.75	to	10.25
Machine shop turnings	9.75	to	10.25
Mixed borings and turnings	9.75	to	10.25
Iron and steel pipe (1 in. diam.,			
not under 2 ft. long)	11.75	to	12,25
Stove plate	11.50	to	12.50
Locomotive grate bars	11.50	to	12.50
Malleable cast (railroad)	14.00	to	14.50
Cast iron car wheels	14.50	to	15.00
No. 1 heavy breakable cast	12.00	to	12.50
Dulosa mhich dealess in Many Way	de ami	2 X	moolela

Buffalo

Change from Pittsburgh Plus Has Tendency to Check Buying

Pig Iron.—A sharp pick-up in blast furnace opera-tion characterizes the situation in this territory this week. The Lackawanna plant of the Bethlehem Steel Co. has placed additional stacks in blast, bringing the total of those blowing in this plant now to five. Three other furnace interests have two stacks each in blast, so that the total for the district is now 11, or exactly 50 per cent. The inquiry for the past week reached a total of 10,000 tons. The Gould Coupler Co. sought to place 2000 tons of malleable. The Kensington Davies Co. placed 1000 tons of No. 2 plain, 1.75 to 2.25 silicon, and another inquiry for 1500 tons of malleable was in the field. All of the iron sought is for fourth quarter delivery. One producer booked between 5000 and 6000 tons of iron. The price structure exhibits the same characteristics as last week. Just a little more of an inclination is noted to retain \$19.50 base, but this price has been shaded during the past week and some of the larger lots have commanded \$19 base. In some instances the \$19.50 base is kept, but the No. 1, 2.75 to 3.25 silicon grade, shows varying prices. One interest has quoted \$21 on this grade, while a competitor has quoted \$20.50. The character of the competition is apparent when it is recalled that the cost price for most merchant furnaces in this district is said to be somewhere between \$19 and \$19.50. Only three interests are actively contending for pig iron business just now, the Donner Steel Co. being in a sold-up condition and the Wickwire Company being out of the market.

We quote prices f.o.b. gross ton, Buffalo, as follows:
No. 2 plain, sil. 1.75 to 2.25....\$19.00 to \$19.50
No. 1 foundry, sil. 2.75 to 3.25... 20.00 to 21.00
No. 2 foundry, sil. 2.25 to 2.75... 19.50 to 20.00
Malleable, sil. up to 2.25.... 19.00 to 19.50
Basic 19.00 to 19.50

Lake Superior charcoal

Finished Iron and Steel.-Changes in connection with the transition from Pittsburgh basing have helped to retard the market, but signs are at hand that this delay is temporary. Jobbers and consumers are buying very much more freely; stocks in consumers' hands are low, and all indications point to a resumption of good steel business very soon. There has been no hardening of prices over the past couple of weeks, but mills hold that the figures being quoted on bars, shapes and plates do not begin to approximate the proper prices for these commodities, and as soon as mills have accumulated a sufficient backlog increases will be put through. The general price on bars now is 2.365c, delivered Buffalo. The basis of this quotation is 26.5c. freight from Pittsburgh to Buffalo, which figures back to 2.10c., Pittsburgh. The price on shapes is 2.265c. Buffalo and the plate price as low as 1.965c. delivered here. Most of the mills are very much "in the air" over the changed program and their selling policy has not yet crystallized. In the main a delivered price is being quoted, competition being closely gaged. Re-inforcing bar business shows one award during the week of 100 tons for a building in Rochester, with about 400 tons of road work pending. A local structural fabricator took 1700 tons for a powerhouse for the Narragansett Electric Light Co., Providence, R. I. One fabricating concern which has had an unusually good summer cannot take any more sizable jobs for delivery before December. A slight recession has occurred in semi-finished, and there has been some evidence of a slight softening in prices. Sheets are fairly firm at 3.50c. Pittsburgh, with nothing up but odd lots.

Steel bars, 3.30c.; iron bars, 3.35c.; reinforcing bars, 3.30c.; structural shapes, 3.40c.; plates, 3.40c.; No. 10 blue sheets, 4.05c.; No. 28 black sheets, 4.75c.; No. 28 galvanized sheets, 5.85c.; bands, 4.05c.; hoops, 4.40c.; cold finished rounds, 4.20c.; cold-finished shapes, 4.70c.

Old Material.—The market holds fairly firmly to last week's levels, with a resumption of the waiting attitude, following the flurry which induced more or less heavy buying by two of the local mills. One of the lots of heavy melting steel which will be brought to a local mill on the buying of two weeks ago will be transported from the Hudson valley via New York State barge canal, a departure in scrap transportation custom. About 15,000 tons is involved. Scrap dealers are still buying material, waiting for the upward trend of prices which they believe must come. They believe the mills will have to come to their price levels eventually; the mill men do not think so. Buying by the mills two weeks ago was at a price somewhat higher than they would have had to pay a month ago, and to some extent justified the opinion of the dealers in the strength of the market. Some flashings have been bought at \$15 to \$15.50. A fair tonnage of flashings is on the market following a bull movement some weeks ago in which the dealers bought, figuring on selling immediately, but failing in this were forced to store. This tonnage they are now anxious to sell, but the consumers in this district are very particular concerning the grade, accepting none but high-grade. Some buying of grate bars has taken place by a Depew con-cern with \$16.75 said to have been the price. Blast furnace scrap seems to be quiet, though operation here has sprung up sharply.

has sprung up sharply.

We quote f.o.b. gross ton, Buffalo, as follows:

Heavy melting steel\$17.00 to \$18.00

Low phosphorus, 0.04 and under 19.50 to 20.50

No. 1 railroad wrought15.50 to 16.00

Car wheels16.00 to 16.50

Machine shop turnings12.00 to 12.50

Cast iron borings12.00 to 12.50

No. 1 busheling15.50 to 16.00

Stove plate16.00 to 16.50

Grate bars15.00 to 15.50

Bundled sheets15.00 to 15.50

Railroad malleable17.50 to 18.50

No. 1 machinery cast17.50 to 18.00

Birmingham

Sale of 65,000 Tons of Pig Iron—Rail Orders Exceed 100,000 Tons

BIRMINGHAM, ALA., Sept. 30 .- One of the active companies is reported to have sold 65,000 tons of iron with another following closely with 40,000 tons. The Tennessee Coal, Iron & Railroad Co. has sold foundry iron liberally recently and has three out of its 10 furnaces in blast on foundry. Active sales during the month, inquiries still coming in, firmer prices for iron and prospects bright for considerable tonnage being sold during the next two weeks, are the features which picture the Southern pig iron market. Sales of iron have been made as low as \$17.50 per ton, No. 2 foundry, but this week the average is \$18 with smaller interests selling at \$18.50 and sounding out \$19 with probabilities of asking the latter quotation before another fortnight. The surplus stock of iron has been reduced during the month by at least 10,000 tons and expectations are that during the last three months there will be need for considerable iron on the yards. Fifteen furnaces in this State are producing foundry iron and eight are on basic. Many consumers, especially those which have been buying in small lots, are asking delivery on their contracts and much iron is moving. The melt of iron contracts and much iron is moving. The melt of iron in the home territory has been showing slight increase weekly and this condition will continue through this month at least. Survey of the field shows that the furnace companies of Alabama have sold very nearly two months' make. The pipe plants of the district on gas and water pipe have provided for needs for three months while several of the soil pipe plants have pur-chased a little ahead. The policy of hand-to-mouth buying on the part of the smaller consumers continues.

We quote per gross ton, f.o.b. Birmingham district furnace as follows:

Cast Iron Pipe.—Shipment of gas and water pipe as quickly as it is manufactured and can be tested is the rule still and as a consequence there is no stock on hand. Quotations continue as they have been ranging from \$45 to \$50, 4- and 6-inch pipe and over.

Steel.-Production of steel in the Birmingham district remains unchanged, the Tennessee Coal, Iron & Railroad Co. operating not much under capacity at all while the Gulf States Steel Co. still operates at 50 per cent in its open-hearth mills and much better in the finishing department. The Tennessee Company is receiving new business almost every day, rail orders being announced frequently. The Louisville & Nashville Railroad Co. has placed an order for 62,129 tons of rail, delivery next year, 59,171 tons of it to be new standard rail, the order being valued at approximately \$2,670,000. The Atlantic Coast Line and the Illinois Central railroads have each placed an order for 20,000 tons of rail, next year's delivery. Soft steel bars are quoted at 2.30c. to 2.35c., Birmingham.

Coke.—No change is noted in the coke market, prices a little weaker and demand, except with the iron producers showing no improvement. The Black Creek Coal & Coke Co. has started up 57 beehive coke ovens at New Castle and the Woodward Iron Co. has put in commission some of its by-product coke ovens which have been under repairs or out to adjust the production. Coke prices are given at \$4.50 to \$5 and \$5.25 for foundry and the lower price for furnace coke. Five dollars is the average foundry coke price in the district.

Old Material.—The scrap iron and steel market in the Birmingham district continues to lag. No. 1 cast and stove plate are the most favored products and no tonnage worth mentioning of these has been sold recently. Dealers are abstaining from laying in stock beyond what they are selling, in short, speculation being kept off.

We quote per gross ton f.o.b. Birmingham district yards as follows:

. 5	AUD EED LOHOWD.
	Cast iron borings, chemical\$15.00 to \$16.00
	Heavy melting steel 12.50 to 13.00
	Railroad wrought 12.00 to 13.00
	Steel axles 17.00 to 18.00
	Iron axles
	Steel rails 12.50 to 13.00
	No. 1 cast 14.00 to 15.00
	Tram car wheels 15.00 to 16.00
	Car wheels 14.00 to 15.00
	Stove plate
	Machine shop turnings 6.00 to 7.00
	Cast iron borings 7.00 to 8.00
	Rails for rolling 15.00 to 16.00

Boston

Buyers Are Sounding Out Pig Iron Prices, but Actual Sales Are Small

BOSTON, Sept. 30.—Actual pig iton sales were again confined to small tonnages the past week, with aggregate business falling well under 5000 tons. Eastern Pennsylvania iron appears more active than other kinds, although Buffalo is a close second. As steel mills grow busier, they are less inclined to offer pig iron on this market. Buffalo iron is still obtainable at \$19 furnace base, although most furnaces are on a basis of \$19.50 or \$20. Current business is confined largely to No. 2X at \$20 and \$20.50 furnace, and No. 1X at \$20.50 and \$21. No. 2X eastern Pennsylvania has sold at \$21 and No. 1X at \$21.50 furnace, in most instances. India iron has sold at \$24 and \$24.50 delivered in Massachusetts or around \$21 on dock here, duty paid. Some buyers are sounding out the market on prices with a view to making purchases within the next month. While no actual inquiries are in hand, one foundry has signified its intention of buying 10,000 tons No. 2X and No. 1X; another 5000 to 6000 tons No. 2 plain, and still another 1000 tons No. 2X and No. 1X. Smaller prospects bring the aggregate possible business close to 20,000 tons.

We quote delivered prices on the basis of the latest reported sales as follows, having added \$3.65 freight from eastern Pennsylvania, \$4.91 from Buffalo, \$5.92 from Virginia and \$9.60 from Alabama:

A	10, \$5.92	fron	n Vi	rgin	ia a	ind	1	19,	.60	from	Alab	ama	
	East. Pe	nn.,	sil.	1.75	to	2.2	5			23.65	to \$25	.15	
	East, Pe	enn.,	sil.	2.25	to	2.7	5		0.0	24.15	to 25	.15	
	Buffalo,												
	Buffalo,	sil.	2.25	to	2.75					24.41	to 24	.91	
	Virginia	sil.	1.75	to	2.25				0 0	29.42	to 29	.92	
	Virginia	, sil.	2.25	to	2.75					29.92	to 30	.42	
	Alabama	ı, sil.	1.75	to	2.25					27.10	to 27	.60	
	Alahami	a sil	2 25	to	2 75					27 60	10 95	10	

Warehouse Business.—Independent warehouses are sitting tight, awaiting further developments in the mill price situation before taking any action on new quotations. Business with them is only fair. Stocks are fairly well assorted, but not excessive. Wire nails have been reduced 5c. a keg, making the from stock price \$3.80 per keg base. Cut nails also are 5c. per package lower. Barbed wire has been reduced 5c. per 100 lb. Sheet brass is off %c. per lb., seamless brass tubing %c., sheet copper %c., and bare copper wire %c., according to manufacturers' lists, yet local warehouse prices remain as heretofore.

Coke.—Although the movement is not universal among foundries, more of them are beginning to stock up with by-product foundry coke for the winter. Such contract specifications coupled with a slightly better current demand give the market a more active appearance than noted in weeks. Ovens of both the New England Coal & Coke Co. and the Providence Gas Co., however, are still operating on domestic fuel to a large extent. Both companies quote by-product foundry coke at \$11.50 a ton delivered in New England.

Old Material.—The old material market has again become quiet, and although prices quoted by brokers are about on a par with previous quotations, the market appears to have lost none of its underlying strength. Most of the few cars of heavy melting steel purchased the past week for shipments to eastern Pennsylvania were taken at \$17 delivered or around \$12.60 on cars here, whereas a week ago sales reported at \$13 were fairly numerous. For machine shop turnings, rolling mill borings and mixed borings and turnings \$9.25 on cars here seems about the top of the market, although some brokers are holding for \$9.50. Some business was put through recently at \$9. Chemical borings, which are scarce, are moving in a small way at around \$12 on cars, and a little skeleton in 4-ft. bundles at \$9 to \$9.50. Otherwise old material for steel mill use is in-Actual sales of machinery cast are being made at points outside Boston at prices under those quoted here. Some business is reported at \$19 delivered for No. 1 material. The Boston & Maine Railroad received good prices for the 85 cars of material sold last week. Bids closed Oct. 1 on 700 tons of rerolling rails and 1150 tons of miscellaneous material offered by the Boston & Albany Railroad.

The following prices are for gross ton lots delivered consuming points:

ivered consuming points:			
No. 1 machinery cast\$19.00	to	\$20.00	
No. 2 machinery cast 16.00	60	17.00	
Stove plates 15.00	to	15.50	
Railroad malleable 17.00	to	17.50	
The following prices are offered per	gr	coss to	n
ots, f.o.b. Boston rate shipping points:			
No. 1 heavy melting steel\$12.50	to	\$13.00	
No. 1 railroad wrought 13.50	to	14.00	
No. 1 yard wrought 12.50			
Wrought pipe (1-in, in diam.,			
over 2 ft. long) 11.50	to	12.00	
Machine shop turnings 9.00	to	9.50	
Cast iron borings, chemical 11.00	to	12.00	
		9.25	
		9.25	
		9.50	
Street car axles 18.00			
Rails for rolling 13.50	to	14.00	

Detroit Scrap Market

DETROIT, Sept. 30.—The tonnage of waste materials offered by the largest producers for October delivery shows a marked decrease as a result of the low production schedules of the automobile manufacturers. The market has a decidedly soft tendency and few sales of any size have been recorded during the past week. The melt in the district is materially the same as a month ago and melters are operating more or less on a month to month basis.

The following prices are quoted on a gross ton basis f.o.b. cars producers' yards, excepting stove plate, No. 1 machinery cast and automobile cast, which are quoted on a net ton basis:

Heavy melting steel	\$ 15.25 to	\$15.75
Shoveling steel	 15.00 to	15.50
Borings	 11.75 to	12.25
Short turnings	 11.50 to	12.00
Long turnings	 10.50 to	
No. 1 machinery cast	 16.00 to	17.00
Automobile cast	 18.00 to	
Hydraulic compressed	 13.50 to	14.00
Stove plate	 14.00 to	14.50
No. 1 busheling	 13.00 to	13.50
Sheet clippings	 8.50 to	9.00
Flashings	11.75 to	

St. Louis

Pig Iron Market Quiet—Orders for Finished Materials Small

St. Louis, Sept. 30.—The principal sale of the week was 2000 tons of basic, which was made by the St. Louis Coke & Iron Co. to an East Side melter. Inquiries before the market total 5000 to 6000 tons, of which 4000 tons is from one concern in the district. On the whole, the market continues quiet, and some weakness is being felt as a result of the lack of buying. Reports of melters show conditions to be spotted. Plants specializing in railroad castings are very busy. Orders are for quick delivery, and some plants that were idle a month or so ago have had to farm out some of their business. The market is nominally unchanged, and each inquiry of size is more or less a matter of bargaining.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices \$2.16 freight from Chicago, \$3.28 from Florence and Sheffield (rail and water), \$5.17 from Birmingham, all rail, and \$1c. average switching charge from Granite City:

Northern fdy., sil. 1.75 to 2.25 Northern malleable, sil. 1.75 to	\$23.16
Basic	23.16 23.16
(rail)\$23.17 to	23.67
Southern fdy., sil. 1.75 to 2.25 (rail and water)	

Finished Iron and Steel.—The policy of buying from hand to mouth is still in force among the consumers of steel products in this section. Orders continue small and, if anything, fewer in number. There are no sizable inquiries from railroads before the market, and there is no hint yet that there will be any buying of rails.

For stock out of warehouse we quote: Soft steel bars, 3.35c. per lb.; iron bars, 3.35c.; structural shapes, 3.45c.; tank plates, 3.45c.; No. 10 blue annealed sheets, 4.10c.; No. 28 black sheets, cold-rolled one pass, 5c.; cold rolled rounds, shafting and screw stock, 4.15c.; structural rivets, 3.90c.; boiler rivets, 4.10c.; tank rivets, 5-in. and smaller, 60 per cent off list; machine bolts, 55 and 5 per cent; carriage bolts, 40 and 5 per cent; lag screws, 60 and 5 per cent; hot pressed nuts, squares or hexagons, blank or tapped, \$3.50 off list.

Coke.—The coke market is showing just a bit more activity. Dealers are buying more domestic grades, but this is merely to cover purchases made by consumers, and dealers are still not disposed to commit themselves heavily as to the future.

Old Material.—The market for old material is weaker, a situation caused by the failure of consumers to buy larger tonnages as they had been expected to do, and the pressure of distressed cars on dealers. The latter problem is being solved, but consumers are buying now only to satisfy immediate needs. New lists include: Dodge Bros. Detroit, 1500 tons; Santa Fe System, 2000 tons; Pennsylvania System, 33,000 tons, and Big Four open list.

We quote dealers' prices f.o.b. consumers' works, St. Louis' industrial district and dealers' yards, as follows:

Per Gross Ton		
Iron rails Rails for rolling Rails for rolling Steel rails less than 3 ft. Relaying rails, 60 lb. and under. Relaying rails, 70 lb. and over. Cast iron car wheels Heavy melting steel Heavy shoveling steel Frogs, switches and guards cut	316.50 to 18.00 to 19.00 to 25.00 to 32.50 to 17.50 to 15.25 to 17.50 to	\$17.00 18.50 19.50 26.00 33.50 18.00 15.75 15.75
apart Railroad springs Heavy axles and tire turnings No. 1 locomotive tires Per Net Ton	20.00 to 12.50 to 17.00 to	20.50 13.00 17.50
Steel angle bars Steel car axles Iron car axles Wrought iron bars and transoms No. 1 railroad wrought Cast iron borings No. 1 busheling No. 1 railroad cast No. 1 machinery cast Railroad malleable Machine shop turnings Champion bundled sheets.	16.00 to 19.50 to 24.00 to 13.00 to 13.50 to 10.50 to 17.50 to 17.50 to 14.50 to 8.00 to 8.00 to	16.50 20.00 24.50 18.75 13.50 14.00 11.00 14.00 18.50 15.00 8.50 9.00

Cincinnati

Small Lot Buying of Pig Iron—Southern Apparently Firmer

CINCINNATI, Sept. 30 .- Small lot buying featured the pig iron market last week, orders ranging from Prices continue fairly carloads to 500 tons. steady in Northern irons, there being no change in the Ironton quotation of \$20, though it is reported that Lake front furnaces are quoting \$19.50, Ironton basis. To melters in this territory, Chicago furnaces are reported to have made several quotations of \$19.50, furnace, on inquiries from northeastern Indiana, and a sale of 1000 tons of malleable on that basis is reported. The Birmingham market is firming up to \$18, though Tennessee furnaces were quoting \$17.50 for prompt shipment last week. For first quarter some Southern furnaces have intimated that \$18, Birmingham, can be done. There are several inquiries current for this delivery, including one from the Globe Stove Co. 1000 tons of foundry, and one for the Cincinnati plant of the Worthington Pump & Machinery Corporation for 1700 tons of various grades. Several sales of silvery iron were made on the basis of \$29.50, furnace, for 8 per cent, but no activity was noted in either Bessemer or basic grades.

Sheets.—A reduction of \$3 per ton in automobile body sheets has been put into effect by the leading producers, the new price being 4.60c., Pittsburgh. Otherwise prices are unchanged at 2.60c., to 2.70c., for blue annealed, 3.50c. to 3.60c. for black and 4.50c. to 4.60c. for galvanized, all f. o, b. Pittsburgh, with Chicago mills quoting \$2 per ton above these prices. There has been an improvement in the demand for blue annealed sheets in the last few days, but other finishes are quiet. No change in tin plate prices appears likely, other than that mills will undoubtedly follow the lead of the American Sheet & Tin Plate Co. in its quotations.

Structural Steel.—New inquiries are light, and present indications point to a quiet fall and winter. A number of projects on which bids had been taken will likely go over till next spring. Awards were few, with no outstanding tonnages involved.

Reinforcing Bars.—While there are no important projects up for bids, the demand for reinforcing bars is showing steady improvement. The Bourne-Fuller Co. has taken 100 tons for a power house at Mariemont, near Cincinnati. The largest inquiry current is for 300 tons for the Scioto County courthouse, Portsmouth, Ohio, on which an award is expected this week. A manual training school at Marietta, Ohio, calls for 300 tons of bars. Reinforcing bar prices range from 1.90c., mill, for hard steel bars, to 2.10c., mill, on bars rolled from new billets.

Warehouse Business.—Local jobbers continue to report a steady improvement in the demand for iron and steel products, and all classes of materials are moving in better volume. Orders, however, are mostly for small tonnages, but the number and size of these is steadily increasing, and the volume in September will be up to that of the first few months of the year. Prices are being firmly maintained.

Cincinnati jobbers quote: Iron and steel bars, 3.30c.; reinforcing bars, 3.30c.; hoops, 4.35c.; bands, 3.95c.; shapes, 3.40c.; plates, 3.40c.; cold-rolled rounds, 4.55c.; cold-rolled flats, squares and hexagons, 4.55c.; open-hearth spring steel, 4.75c. to 5.75c.; No. 10 blue annealed sheets, 3.90c.; No. 28 black sheets, 4.60c.; No. 28 galvanized sheets, 5.75c.; No. 28 parkeg base; cement coated nails, \$3.30 per keg base; cement coated nails, \$3 per keg.

Finished Materials.—The market is quiet pending further developments in the price situation necessitated by the elimination of Pittsburgh basing. Undoubtedly the policy of the independent mills will be governed by what the Steel Corporation and its subsidiaries do. Up to date, the only announcement from an independent mill is that of a Youngstown pipe producer, which has established basing points at Pittsburgh, Lorain and Chicago. This is taken as an indication that plants in Youngstown and vicinity will establish the same basing points on all products as the Steel Corporation. Prices of the heavier products continue to be named by independent mills on a Pittsburgh basis, plates being quoted at 1.85c., to 1.90c., Pittsburgh, shapes at 2c. Pittsburgh, and bars at 2c. to 2.10c., Pittsburgh. So far mills in this territory producing wire nails and other wire products have not followed the lead of the American Steel & Wire Co. and are quoting wire nails at \$2.80 per keg mill, and plain wire at \$2.55 per 100 lb. mill. There is little activity in track accessories or light rails, and prices are nominally unchanged. The Big Four Railroad has an inquiry out for its fourth quarter requirements of blue annealed sheets and safe ends, but otherwise buying is of the hand to mouth variety.

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Fluorspar.—Demand is light, with prices fairly steady at recent quotations. Prices are given on page 887.

Coke.—The coke market is inactive in furnace and foundry grades, but domestic coke is showing more life. Prices are unchanged at quotations given below.

Connellsville furnace, \$3: foundry, \$4.50 to \$5.50; New River foundry, \$8.50 to \$9; Wise County furnace, \$3.75; foundry, \$4.50 to \$5.50; by-product foundry, \$6.50, Connellsville basis.

Old Material.—There was little activity in this mar-

Old Material.—There was little activity in this market last week, and indications point to another quiet week. Consumer demand is still light, and what little activity there is is confined to trading between dealers. Prices are unsteady.

We quote dealers' buying prices, f.o.b. cars, Cincinnati:

incinnati:	
Per Gross Ton	
Heavy melting steel\$14.00 to	14.50
Scrap rails for melting 12.50 to	13.00
Short rails 16.50 to	17.00
Relaying rails 29.00 to	29.50
Rails for rolling 14.50 to	15.00
Old car wheels 13.00 to	13.50
No. 1 locomotive tires 14.50 to	15.00
Railroad malleable 15.00 to	15.50
Agricultural malleable 13.50 to	14.00
Loose sheet clippings 10.00 to	10.50
Champion bundled sheets 11.00 to	11.50
Per Net Ton	
Cast iron borings 9.50 to	10.50
Machine shop turnings 8.50 to	9.00
No. 1 machinery cast 17.50 to	18.00
No. 1 railroad cast 15.00 to	15.50
Iron axles 21.00 to	21.50
No. 1 railroad wrought 10.50 to	11.00
Pipes and flues 7.50 to	8.00
No. 1 busheling 9.50 to	10.00
Mixed busheling 7.50 to	8.00
Burnt cast 10.00 to	10.50
Stove plate 10.00 to	10.50
Brake shoes 11.50 to	12.00

Cleveland

Quoting of Delivered Prices on Bars, Plates and Shapes Is Now General

CLEVELAND, Sept. 30.—Very slow progress is being made in clearing up the situation that has resulted from the abandonment of the Pittsburgh basing point by the Steel Corporation. However, the plan of quoting delivered prices on steel bars, plates and structural material has become general. Mills are naming delivered prices to meet competition at the point of delivery, resulting in a great deal of irregularity in quotations whether based on f.o.b. mill or figured back to a Pitts-This method is reducing the importance burgh base. of basing points at least to buyers who are interested in getting their material at the lowest delivered prices possible regardless of how mills compute their prices. Generally independent mills outside of the Pittsburgh district continue to figure their prices on the Pittsburgh base plus the freight to destination. Independent sheet mills in Ohio have adopted no definite selling policy, but as a rule continue to quote on Pittsburgh base, although some f.o.b. mill quotations are reported. However, during periods of keen competition some sheet mills have heretofore quoted f.o.b. mill. For shipment to Detroit, Ohio mills, if they adopt a mill base, will have only a slight advantage over Pittsburgh district mills, the Ohio freight rates to Detroit in no case being over \$1 a ton below the Pittsburgh rate to that city. Buffalo will also have a freight advantage of about \$1 a ton for Detroit delivery by using Buffalo base. However, for Western shipment, Ohio sheet mills will apparently be unable to meet the competition of the Chicago district mills. With a Conv. base of 22 about 15 and 15 With a Gary base of 2c. above cago district mills. Pittsburgh, Ohio mills have to absorb \$3 to \$4 a ton in freight rates to get into Chicago. Cleveland plate mills will not be affected any more than they have been for shipment to the Chicago territory where they have been largely shut out by the previous use of Chicago as a basing point.

October 2, 1924

The consensus of opinion of steel men is that the abandonment of the Pittsburgh basing point will result in the localizing of steel business and that the bulk of the business in a certain territory will go to the mills nearest at hand and having the lowest freight rate to points of delivery. Buyers are still holding back orders because of the confusion that has been caused and the volume of business is rather light. In the meantime, considerable tonnage has come up which will be placed as soon as the situation is cleared up. The only important letting in the structural field is the American Insurance Union Building, Columbus, requiring 5000 tons.

Pig Iron.—Shipments of considerable tonnage of basic pig iron have been held up the past few days as a result of the slowing down in steel business due to the uncertainties that have been caused by the elimination of the Pittsburgh basing point and other grades of pig iron seem to have been affected because of a tendency on the part of some buyers to hold off because of the steel situation. Sales during the week were in rather light volume. Considerable new inquiry came out for first quarter contracts and one interest booked a few lots including 1800 tons for that delivery. However, only two producers in this territory are willing to quote for the first quarter. In some sections, buyers are well covered for their requirements for the remainder of the year, but in others many foundries are expected to need more iron if the melt keeps up at the present rate. One interest sold several thousand tons during the week, but business booked by other furnaces was rather light. A large pump manufacturer is inquiring for 5000 tons of foundry iron for the last half and first quarter. Considerable inquiry is coming from the New England territory. The market still has its weak spots. Some Lake and Valley furnaces are holding to \$20 for foundry iron but others are quoting \$19.50. While \$19.50 appears to be the minimum base quotation, there seems to be some disposition to make concessions by waiving the silicon differentials. reported include 1500 tons taken by a Cleveland interest for delivery in Pittsburgh territory at a base price of \$20. For Cleveland delivery the price is unchanged at \$20.50 at furnace. Southern foundry iron ranges from \$17.50 to \$18, Birmingham. Ohio silvery iron is weak with quotations of \$28.50 and lower for 8 per cent.

Quotations below, except on basic and low phosphorus iron, are delivered Cleveland, and for local iron include a 50c. switching charge. Ohio silvery and Southern iron prices are based on a \$3.02 freight rate from Jackson and \$6 rate from Birmingham:

Nails and Wire.—With the adoption of the Cleveland basing point on nails and wire eliminating the \$2 differential over Pittsburgh, the American Steel & Wire Co. has added a 2c. charge for switching a minimum carload of 25 tons, making the local car lot delivered prices 2.77c. on nails and 2.52c. on plain wire. For smaller lots a charge of 6c. to 10c. is made for trucking.

Bolts, Nuts and Rivets.—Cleveland bolt and nut manufacturers who for some time have been using both Pittsburgh and Chicago as their basing points and with Cleveland as basing point for delivery only within the industrial limits of Cleveland, expect to make no change in their basing point practice. The leading local rivet manufacturer has adopted Cleveland as the basing point on orders coming from railroad lines that reach Cleveland or the nearby territory but for the present at least will adhere to the Pittsburgh and Chicago basing points with a \$3 Chicago differential. Fourth quarter contracts for shipment from Cleveland are being made on a Pittsburgh basis but conditions may possibly cause a revision of the contracts later. Bolt and nut manufacturers report a heavy volume of specifications on contracts that expire Sept. 30. Prices are firm.

Semi-Finished Steel.—The leading local producer is now quoting semi-finished steel on a Cleveland basis, naming a \$37.50 price on sheet bars, billets and slabs. Small lot sales of sheet bars are reported by a Youngstown mill at \$37.50, Youngstown. Billets and slabs are quoted at around \$36, Youngstown. With the adoption of a Cleveland base, wire rods are quoted at \$46, Cleveland. Deliveries on considerable tonnage of sheet bars have been held up because of the unsettled situation caused by the abandonment of the Pittsburgh basing point.

Steel Bars, Plates and Structural Material.—The steel bar market lacks firmness, although the commonly quoted price is based on a 2c. Pittsburgh price and some business is being taken at 2.10c. Plates are weak with quotations ranging from 1.80c. to 1.90c. Pittsburgh. Structural material is 2c. Pittsburgh.

Jobbers quote steel bars, 3.10c.; Plates and structural shapes, 3.20c.; No. 28 black sheets, 4.35c.; No. 28 galvanized sheets, 5.45c.; No. 10 blue annealed sheets, 3.45c. to 3.60c.; cold-rolled rounds, 3.90c.; flats, squares and hexagons, 4.40c.; hoops and bands, 1 in. and wider and 20 gage or heavier, 3.85c.; narrower than 1 in. or lighter than No. 20 gage, 4.35c.; No. 9 annealed wire, 3.30 per 100 lb.; No. 9 galvanized wire, 3.75 per 100 lb.; common wire nalls, \$3.40 base per 100 lb.

Hot-Rolled Steel.—Bands are quoted at 2.40c., and hoops at 2.50c., Pittsburgh, but the differential between the two materials is not closely maintained. Wide strip steel is irregular with quotations down to 2.15c.

Sheets.—The sheet market is badly upset owing to the uncertainty due to the abandonment of the Pittsburgh basing point and buyers are ordering only for immediate requirements. Black sheets are weak with quotations down to 3.25c. for desirable lots. A leading Detroit automobile manufacturer has purchased 4000 tons of blue annealed at 2.35c., although the usual minimum quotation is 2.60c. Auto body sheets have declined \$3 a ton to 4.60c. The above prices f.o.b. Pittsburgh.

Cold-Rolled Strip.—Another Cleveland producer has followed the American Steel & Wire Co. in adopting a Cleveland base. Cold-rolled strip is quoted at 4c., Cleveland.

Reinforcing Bars.—Work involving considerable tonnage is being figured on. Bids have been taken for 350 tons for a building for the General Electric Co., Schenectady, N. Y., and for 385 tons for the Erie Lithograph Co., Erie, Pa. Bids received today for 19,000 tons for the Union Station, Cleveland, have not yet been opened. New billet bars lack firmness. These are being commonly quoted at delivered prices that figure back to 2c. to 2.10c., Pittsburgh, but a round lot inquiry would bring out around 2.10c., Cleveland.

Coke.—The foundry coke is moving rather slowly with prices unchanged at \$4 to \$5.50 for standard Connellsville makes. A Painesville chemical company recently began the manufacture of by-product foundry coke which is quoted at \$6.50 Painesville.

Iron Ore.—Shipments have been falling off the latter part of the month and the total Lake movement for September is expected to be slightly under 6,000,000 tons. Furnace yards of some consumers are so crowded that they are holding back on shipments.

Old Material.—The market has further weakened and heavy melting steel is \$1.50 a ton lower in the Valley district than two weeks ago. Dealers are now paying only \$18 for this grade for delivery in Youngstown and the surrounding consuming points. Heavy melting steel has declined in Cleveland 75c. a ton with \$18 now the asking price by dealers and other grades are down from 50c. to 75c. a ton. The market has

settled down to another dull period with virtually no buying by the mills. The present inactivity is partly attributed to the unsettled aituation due to the elimination of the Pittsburgh basing point.

We quote dealers' prices f.o.b. Cleveland per gross ton:

Heavy melting steel	\$16.00 to	\$16.25
Rails for rolling	16.25 to	16.50
Rails under 3 ft	17.50 to	
Low phosphorus melting	18.50 to	19.00
Cast fron borings	14.25 to	14.50
Machine shop turnings	13,25 to	13.50
Mixed borings and short turnings	14.00 to	14.25
Compressed sheet steel	13.75 to	14.25
Railroad wrought	14.25 to	14.50
Railroad malleable	18.50 to	18.75
Light bundled sheet stampings	13.25 to	13.50
Steel axle turnings	14.50 to	14.75
No. 1 cast	18.75 to	19.00
No. 1 busheling	13.50 to	13.75
Drop forge flashings	12,25 to	12.50
Railroad grate bars	13.75 to	14.00
Stove plate	13,75 to	14.00
Dinos and fines	19 00 40	19 95

Philadelphia

Abandonment of Pittsburgh Basing of Little Effect in Eastern Pennsylvania District

PHILADELPHIA, Sept. 30.—There is nothing to indicate that the abandonment of Pittsburgh basing for steel products by the United States Steel Corporation and some of the independents will have any marked effect upon prices or conditions of doing business in the Philadelphia district. So far the only change is that most of the mills are quoting delivered prices rather than f.o.b. prices, but the actual cost of material to the consumer figures out exactly the same. In fact, the Eastern mills, in making quotations, simply include the freight from Pittsburgh in their delivered prices.

Orders for steel in the past week have shown a slight gain over the preceding week notwithstanding the expectation that the change in methods of quoting would have an upsetting effect. The fact is that Eastern consumers have generally understood that the new deal would not alter their situation and have accepted the delivered method of quoting with very little comment. The gain in orders in the past week does not mean that business is good; there continues to be a considerable degree of disappointment among steel companies that recovery has not been more rapid. In some lines, notably in structural shapes, conditions are not so promising as they were a month ago. Prices continue weak. Pig iron is dull and unchanged.

Pig Iron.—Shipments of pig iron from furnaces in the eastern Pennsylvania district are greater than production, but the tonnage being sold is less than pro-As furnaces are fairly well sold up for the last quarter and are not yet taking business for first quarter, this situation is not necessarily a weakening Stocks are being slowly reduced through the factor. fact that the furnaces are shipping more than they are making. Business is dull and prices are unchanged, \$20.50 for No. 2 plain and \$21 for No. 2X, f.o.b. furnace, being the usual quotations on foundry grades. It is intimated that on a large tonnage \$20, base, might be quoted by one or two furnaces. On about 5000 tons bought by the Pennsylvania Railroad for fourth quarter shipment to Altoona, prices were \$20 and \$20.50, furnace, the lower price applying on iron of approximately basic analysis.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia and include freight rates varying from 76c, to 81.63 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25		
sil.	\$21.26 to	\$22.13
East, Pa. No. 2X, 2.25 to 2.75 sil.	21.76 to	32.63
East. Pa. No. 1X	22.26 to	23.13
Virginia No. 2 plain, 1.75 to 2.25		
mil	28.17 to	28.67
Virginia No. 2X, 2.25 to 2.75 sil	28,67 to	29.17
Basic delivered eastern Pa		
Gray forge		
Malleable	22,00 to	22.50
Standard low phos. (f.o.b. fur-		
nace)	24,00 to	25,60
Copper bearing low phos. (f.o.b.		
furnace)	24,00 to	25.00

Ferroalloys.—Several thousand tons of British ferromanganese was sold in the past week at \$95, seaboard, An advance to \$100 by the British interests is predicted. The leading domestic maker quotes \$100, furnace, but has taken little business at this figure. Spiegeleisen is quoted at \$31 to \$32, furnace.

Billets.—On the limited tonnage of billets sold in the past week prices ranged from \$36 to \$37, Pittsburgh, for rerolling quality and from \$41 to \$42, Pittsburgh, on forging quality.

Plates.—Eastern plate mills are operating at from 50 to 75 per cent, the average being nearer 50. Business has not improved, but there is a little more steadiness in prices, which remain at 1.60c. to 1.65c., Pittsburgh, with \$1 or \$2 a ton higher on small lots. The Pennsylvania Railroad bought 500 tons or more, but most of the current orders consist of small lots.

Bars.—Steel bars are still quoted at 2c., Pittsburgh, or 2.32c., Philadelphia, and buying is in moderate volume. Iron bars are also quoted at 2.32c., Philadelphia, equivalent to 2c., Pittsburgh.

Warehouse Business.—There is considerable variation in prices quoted by local warehouses on steel out of stock. The following are minimum quotations for local delivery:

Soft steel bars and small shapes, 3.10c.; Iron bars (except bands), 3.10c.; round edge iron, 3.50c.; round edge steel, iron finished, 1½ x ½ in., 3.50c.; round edge steel planished, 4.30c.; tank steel plates, ½ in. and heavier, 3.10c.; tank steel plates, ½ in. and heavier, 3.10c.; tank steel plates, ½ in., 3.25c.; blue annealed steel sheets, No. 10 gage, 3.75c.; black sheets, No. 28 gage, 4.75c.; galvanized sheets, No. 28 gage, 5.85c.; square twisted and deformed steel bars, 2.85c.; structural shapes, 3.10c.; diamond pattern plates, ¼-in., 5.30c.; ½-in., 5.50c.; spring steel, 5c.; round cold-rolled steel, 4.55c.; steel hoops, 1 in. and wider, No. 20 gage and heavier, 4.10c.; narrower than 1 in., all gages, 4.60c.; steel bands, No. 12 gage to ½ in., inclusive, 3.85c.; rails, 3.35c.; tool steel, 8.50c.; Norway iron, 6.75c.

Old Material.-The old material market has weakened, and while prices are not lower except in a few instances, the maximum prices of a week ago are no longer obtainable. One mill, which was freely offering \$18 for heavy melting steel, is now offering only \$17.50. The October list of the Pennsylvania Railroad contains close to 45,000 tons of various grades of A ruling of the Pennsylvania put into effect about two months ago that shipping instructions must be given within 10 days after a bid is accepted has to a certain extent eliminated dealers from bidding except on material which must be sent to a scrap yard for preparation. On the last list several dealers did not take advantage of their option on material on which they were high bidders because they could not find a sale at a profit within the time limit. The Pennsylvania's new rule probably means that more and more of its scrap will go direct to consumers.

We quote for delivery at consuming points in this

Į.)	strict as follows:				
	No. 1 heavy melting steel	817.00	to !	17.50	
	Scrap rails	17.00	to	17.50	
	Steel rails for rolling	18.50		19.00	
	No. 1 low phos., heavy 0.04 and	10.00	20	10.00	
	under	21.00	to	21.50	
	Couplers and knuckles	20.00		21.00	
	Rolled steel wheels	20.00		21.00	
	Cast-iron car wheels	18.00		18.50	
	No. 1 railroad wrought	19.00		19.50	
	No. 1 yard wrought	17.00			
	No. 1 forge fire	14.00	to	17.50	
	Dundled shoots (for steel works)			14.50	
	Bundled sheets (for steel works)			14.00	
	Mixed borings and turnings (for	40.00			
	blast furnace use)	13.00	to	14.00	
	Machine shop turnings (for steel				
	works use)			14.00	
	Machine shop turnings (for roll-				
	ing mill use)	14.00	to	14.50	
	Heavy axle turnings (or equiva-				
	lent)	16.00	to	16.50	
	Cast borings (for steel works and				
	rolling mills)			14.00	
	Cast borings (for chemical plants)	16.00	to	16.50	
	No. 1 cast	18.00	to	18.50	
	Heavy breakable cast (for steel				
	plants)	16.50	to	17.00	
	Railroad grate bars			15.50	
	Stove plate (for steel plant use)			15.50	
	Wrought iron and soft steel pipes			20100	
	and tubes (new specifications)	16.50	to	17.00	
	Shafting	24.00		25.00	
	Steel axles	24.00		25.00	
		2 4100	200	-0.00	

Structural Material.—Greater weakness has developed in shapes, quotations as low as 1.80c., Pittsburgh, and 1.85c. having been made on exceptional lots, though the market for carload lots remains at

1.90c. Orders for shapes have been in fair volume in the past week, but the volume of new structural work being figured on is declining and the prospects for fabricating shops are less encouraging.

Imports.—Last week's imports at Philadelphia included 7400 tons of iron ore from French Africa.

Suggests Sinking a Shaft to Discover New Chemical Elements

The sinking of a shaft 12 miles deep for the purpose of discovering new chemical elements and metals heavier than any now known is suggested as a possible international project by Sir Charles A. Parsons, adapter of the steam turbine to commercial uses. It came in the course of remarks made by Sir Charles at a luncheon at which he and Senator Luigi Luiggi, president of the Society of Italian Engineers, were guests of honor, at the Engineers' Club, New York, Sept. 26. The luncheon was given by officers of the American Society of Mechanical Engineers, the American Institute of Mining and Metallurgical Engineers, the American Institute of Electrical Engineers and the American Society of Civil Engineers.

The effort to reach new depths in the earth's crust was referred to by the speaker as of more value than polar exploration. Fifty years was estimated as the time necessary to sink a 12-mile shaft, and £20,000,000 would be required to finance the work. It was suggested that the project would provide a great bond of union for the various nations participating.

In discussing the proposal after the luncheon Sir Charles said that British scientists as well as the officials of the Royal Observatory at Greenwich were greatly interested. Based on preliminary experiments over a period of eight years, it was his belief that such a shaft is a practicable engineering project. He would have the shaft 20 ft. in diameter and lined with granite. It would be sunk to different levels in the same way that mining shafts are sunk, and after going below a certain depth provision would have to be made to pump out the heat.

Senator Luiggi is honorary president of the Council of Public works in Italy and one of Premier Mussolini's advisers. He compared the tall buildings of New York with great engineering works of past ages, which he said they exceeded.

Manufacture of Iron and Steel Doors and Shutters

Census Bureau figures from 37 establishments making iron and steel doors and shutters in 1923 show products valued at \$15,367,111, compared with \$12,466,701 from 45 establishments in 1921. The number of wage earners increased from 1782 to 2429 and their wages from \$2,880,909 to \$4,332,767. The value added by manufacture increased from \$8,177,427 to \$9,762,901. Horsepower used in 1923 was 3981, while the coal consumed was 5087 net tons.

Proposed Merger Abandoned

CLEVELAND, Sept. 30.—The proposed merger of the Industrial Works, Bay City Mich., with the McMyler Interstate Co., Cleveland, recently announced, has been abandoned.

The New England Iron and Hardware Association held its annual fall outing at the Tedesco Country Club, Swampscott, Mass., on Tuesday afternoon and evening, Sept. 23. A large number of guests, some of them from New York, and members attended. The chief feature of the outing was the annual golf tournament, more members participating than ever before on similar occasions.

MORE ACTIVE STACKS

Net Gain of Six Blast Furnaces in September in Pittsburgh District

PITTSBURGH, Sept. 30.—September brought a net gain of 7 in the number of active blast furnaces in the Pittsburgh and nearby districts, the total number in production as of today being 71 out of a total of 139 stacks. A month ago the number active was 64. Jones & Laughlin Steel Corporation and Youngstown Sheet & Tube Co. each has added a stack, with the Carnegie Steel Co. three and the Bethlehem Steel Corporation one. The number of active merchant furnaces is the same as a month ago, but not the same furnaces are in production today as a month ago. Furnace of the Hanna Furnace Co. at Leetonia, Ohio, is to go down but the Dover stack of the same company is producing again. Adrian furnace at Dubois, Pa., has gone down, while the Perry furnace, at Erie, has gone on.

The record of furnaces in and out of production as of today compares with that as of Sept. 1, as fol-

Pittsburgh Dis	trict				
STEEL WORKS FU	RNACE	25			
,			Out	-Sept	t. 1—
American Steel & Wire Co. Donora Shoenberger Carnegie Steel Co.	2 2	10	1 2	1 0	1 2
Carrie Clairton Duquesne Edgar Thomson Edith Isabella Lucy	1	7 2 3 6 0 1	0 1 3 5 1 3	7 2 2 6 0 0	0 1 4 5 1 2
Neville Jones & Laughlin Steel Corporation Aliquippa Eliza Soho National Tube Co.	5 6 1 4	5 4 0 2	0 2 1	5 3 0 2	0 3 1 1
Pittsburgh Crucible Steel Co Pittsburgh Steel Co	2	1	1	1	1
MERCHANT FUR	NACES				
Clinton Iron & Steel Co	1	0	1	0	1
Total	59	35	24	33	26

Mahoning	d	Shenango	Valley	Districts
Sm	napri	Warre 1	PITENTAM	PR

EXTENT ALOUNG T	CHAN	AMCIN	601			-
	-	Se	pt.	30-	-Sep	t. Im
	To	tal	In	Out	In	Out
Carnegie Steel Co.						
Farrell		3	1	2	1	2
New Castle		4	2	9	2	2
Niles		1	0	1	0	1
	2		5	1	3	3
Ohlo		6				
Sharon		1	0	1	0	1
Republic Iron & Steel Co		7	2	5	2	5.
Sharon Steel Hoop Co		1	1	0	1	0
Trumbull Cliffs Furnace Co		1	1	0	1	0
Youngstown Sheet & Tube Co		9	-5	4	4	15
MERCHANT FU		CES				
A. M. Byers Co		1	0	1	0	1
Hanna Furnace Co.						
West Middlesex		1	0	1	0	1
Leetonia, Ohio		1	1	0	1	0
Dover, Ohio		1	1	0		1.
Reliance Coke & Furnace Co.		-	-			
West Middlesex, Pa		2	0	1	0	1
		î	1	n	1	0
Sharpsville, Pa	0				o o	
McKeefrey Iron Co	0.0	1	0	1		1
Sharpsville Furnace Co		1	1		1	0
Shenango Furnace Co		3	1	1	1	1
Struthers Furnace Co		1	0	1	0	1
Stewart Furnace Co		1	0	1	0	1
Valley Mold & Iron Corporation.		î	0	î	0	1
vancy more a from Corporation.		8		-		
Total	4	6	22	24	18	28
10081			00	9.4	10	20
Western Penns	sulv	ania				
STEEL WORKS I			125			
Bethlehem Steel Co., Johnstown, P.	a. 1	1	5	6	4	7
MERCHANT FU						
MERCHANT FI	188545			-		
Adrian Furnace Co		1	0	1 .	1	0
American Manganese Mfg. Co		2	0	2	0	- 3
Kittanning Iron & Steel Mfg. Co		1	0	1	0	1
		7	0	A	0	A.
McKinney Steel Co.						
Scottdale, Pa		1	1	0	1	0
Josephine, Pa		2	0	2	0	2 :
		1	1	0	0	1
Perry Furnace Co		1		-	-	
Punxsutawney Furnace Co		1	0	1	0	1
	100	seed:	(migrate)	-	pinne	-
Total	2	0	7	13	6	14
Wheeling D	istri	ct				
STEEL WORKS 1	PER	NACE	DRI			
Carnegie Steel Co.						
Bellaire, Ohio			1	1	1	4
		7	î	3	1	- 6
Mingo, Ohio		9				1
Steubenville, Unio	0.0	1	0	1	0	8.
Steubenville, Ohio National Tube Co		Z	1	1	1	L
Wheeling Steel Corporation	0 0	4	3	1	3	1
Weirton Steel Co		1	1	0	1	0
	-	2000	-	-	Assiste	general .
Total	1	4	7	7	7	7
			71	68	64	75
Grand total	10	13	8.1.	0.0	0.8	0.00

Applications of Welding in Structural Field to Be Discussed

The fall meeting of the American Welding Society will be held at the Hotel Winton, Cleveland, Oct. 30 and 31. A plant inspection trip is being arranged for the afternoon of Oct. 30, the technical session, which will be devoted to the subject of applications of welding in the construction of bridges, buildings and other structures, being scheduled for the following day.

A motion picture entitled "Oxygen—the Wonder

A motion picture entitled "Oxygen—the Wonder Worker," will be presented by the Air Reduction Sales Co., New York, and the process of metallic arc welding will be shown on the screen by the General Electric Co., Schenectady. An actual demonstration of thermit welding from the preparation of the molds to the ignition of the thermit mixture will be given.

Slight Decline in Production in the Youngstown District

Youngstown, Sept. 30.—Steel ingot production and finished steel output shows a moderate decline this week from previously maintained levels, but the recession presents no alarming aspects. The temporary check to expanding operations will not be long maintained, in the opinion of Mahoning Valley sales executives, who predict that orders will be received in renewed volume, once price policies, disturbed by the Pittsburgh base abandonment, are more definitely established. This view is supported by enlarged iron production by the Youngstown Sheet & Tube Co., with the likely resumption during October of two additional stacks by other interests operating in the Mahoning Valley.

It is unlikely steel makers would expand iron out-

put unless they had confidence in the stability of current business.

Sheet mill schedules showing 69 of 120 sheet and jobbing mills active compare with a recent high of 85 active sheet units. The decline this week is due to suspension of its entire plant by the Mahoning Valley Steel Co., at Niles, which has heretofore maintained operations in a consistently satisfactory way. Partially offsetting this loss is the addition of two more mills by the Newton Steel Co., increasing its active units to ten, and slightly broader operations by the Falcon Steel

Busy Youngstown Plants

Youngstown, Sept. 30.—The Youngstown Boiler & Tank Co. is operating at virtually a normal rate, with enough business booked to insure production at 100 per cent for several weeks. The pressed steel department and highway reinforcing mesh departments of the Truscon Steel Co. are active at a capacity rate. The General Fireproofing Co. is maintaining an 80 per cent average production, with ordering steady for steel filing cabinets and metal lath.

United States exports of crude petroleum during the first eight months of 1924 amounted to 502,274,831 gal., valued at \$18,091,341. During the same period exports of refined petroleum aggregated 2,613,972,519 gal., valued at \$266,334,264.

Pilling & Co., New York, are now located at 11 Broadway in offices adjoining those of the Warren Foundry & Pipe Co., with which they are affiliated.

Prices Finished Iron and Steel f.o.b. Pittsburgh

District Mills Carload Lots

Plates	Track Equipment
Sheared, tank quality, base, per lb1.80c. to 1.90c.	Spikes, % in. and larger, base, per 100 lb \$2.80 Spikes, % in. and smaller, base, per 100 lb 3.25 Spikes, boat and barge, base, per 100 lb 3.25
Structural Materials	Track holts, all sizes, base, per 100 lb
Beams, channels, etc., base, per lb2.00c. Sheet piling2.10c. to 2.15c.	Track bolts, heat treated, base, per 100 lb
Iron and Steel Bars	Welded Pipe
Soft steel bars, base, per lb2.00c. to 2.10c. Soft steel bars for cold finishing\$3 per ton over base	Butt Weld
Soft steel bars for cold finishing\$3 per ton over base Reinforcing steel bars, base	Inches Steel Inches Iron Black Galv. Inches Black Galv. 19 1/2 1/4 to 3/4 + 11 +39
Reinforcing steel bars, base. 2.00c. Refined iron bars, base, per lb 2.90c to 3c. Double refined iron bars, base, per lb 4.50c. Stay bolt iron bars, base, per lb . 6.50c to 7.00c.	1/2 to 8/2 51 25 1/2 1/2 22 2
	% 60 48 ½ 1 to 1 ½ 30 13
Hot-Rolled Flats	1 to 3 62 50½ Lap Weld
Hoops, base, per lb. 2.50c. to 2.60c. Bands, base, per lb. 2.40c. to 2.50c. Strips, base, per lb. 2.25c. to 2.40c.	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$
	$2\frac{1}{2}$ to 6 59 $47\frac{1}{2}$ $2\frac{1}{2}$ 26 11 7 and 8 56 $43\frac{1}{2}$ 3 to 6 28 13 9 and 10 54 $41\frac{1}{2}$ 7 to 12 26 11
Cold-Finished Steel	9 and 10 54 41½ 7 to 12 26 11 11 and 12 53 40½ 8utt Weld, extra strong, plain ends
Bars and shafting, drawn or rolled, base, per lb2.70c. Bars and shafting, drawn or rolled, l.c.l., per lb2.95c. *Shafting, turned and polished, base, per lb2.70c.	
Bars, S. A. E. Series, No. 2100	$\begin{array}{cccccccccccccccccccccccccccccccccccc$
Bars, S. A. E. Series, No. 2100. 4.25c. to 4.50c. Bars, S. A. E. Series, No. 2300. 6.00c. Bars, S. A. E. Series, No. 3100. 4.90c. to 5.00c. *Strips, base, per lb. 4.00c.	1 to $1\frac{1}{2}$ 60 $49\frac{1}{2}$ 1 to $1\frac{1}{2}$ 30 14
	Lap Weld, extra strong, plain ends
*Cleveland prices same,	2 ½ to 4 57 46 ½ 2 ½ to 4 29 15 4½ to 6 56 45 ½ 4½ to 6 28 14 7 to 8 52 39 ½ 7 to 8 21 7 9 and 10 45 32 % 9 to 12 16 2
Wire Products (To jobbers in car lots)	7 to 8 52 $39\frac{1}{2}$ 7 to 8 21 7 and 10 45 $32\frac{1}{5}$ 9 to 12 16 2
Nails, base, per keg\$2.75	11 and 12 44 31½ To the large jobbing trade the above discounts are in-
Bright plain wire, base, No. 9 gage, per 100 lb 2.50 Annealed fence wire, base, per 100 lb 2.65	creased (on black) by one point, with supplementary discount of 5 per cent and (on galvanized) by 1½ points, with
Galvanized wire No. 9, base, per 100 lb	supplementary discount of 5 per cent. Note—The above discounts on steel pipe also apply at
Galvanized staples, base, per keg	Lorain and Youngstown, Ohlo, and Wheeling, W. Va. Chicago district mills have a base 2 points less.
Polished staples, base, per keg	Boiler Tubes
The foregoing prices also are quoted f.o.b. Cleveland district mills.	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$
Chicago district mill prices are \$2 per ton above the fore- going; Birmingham mill prices \$3 a ton higher; Worcester,	2½ to 2¾ in 37 1¼ to 1½ in + 8
Mass., mills \$3 a ton higher on products of that plant and Duluth, Minn., mills \$4 a ton higher.	3½ to 3¾ in
Bolts and Nuts	Beyond the above discounts, 2 to 5 fives extra are given on lap welded steel tubes and 3 to 4 fives on charcoal iron
(Chicago and Pittsburgh)	tubes.
Machine bolts, small rolled threads60 and 20 per cent off list Machine bolts, all sizes, cut threads60 and 10 per cent off list	Standard Commercial Seamless Boiler Tubes Cold Drawn
Carriage bolts, smaller and shorter, rolled threads, 60 and 10 per cent off list	1 in
Carriage bolts, cut threads, all sizes60 per cent off list Hot-pressed nuts, blank or tapped, square4.50c. off list	1 1/4 and 1 1/2 in 47-50 3 1/4 and 3 1/4 in 37-40 1 1/4 in 41-44 2 and 2 1/4 in 22-25 4 1/2 in and 5 in 33-37 2 and 2 1/4 in 32-35
Hot-pressed nuts, blank or tapped, hexagons5c. off list C.p.c. and t. square or hex. nuts, blank or tapped 4.50c. off list	$Hot \ Rolled$
C.p.c. and t. square or hex. nuts, blank or tapped. 4.50c. off list Bagle carriage bolts	3 and 3¼ in 38-41 4-in, 43-46 3½ in. and 3¾ in 39-42
If in. and smaller, U. S. S 80, 10, 10 and 5 per cent off list in. and larger, U. S. S 75, 10, 10 and 5 per cent off list	Less carloads, 4 points less. Add \$8 per net ton for more than four gages heavier than standard. No extra for lengths
Small sizes, S. A. E 80, 10, 10, 10 and 5 per cent off list S. A. E., 5/s in. and larger 80, 10 and 5 per cent off list Stove bolts in packages 80, 10 and 5 per cent off list	up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tube list
Stove bolts in packages	and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.
Stove bolts in bulk	Seamless Mechanical Tubing
Turnbuckles, with ends, ½ in. and smaller,	Carbon under 0.30 base
Turnbuckles, without ends 46 in, and smaller.	Plus usual differentials and extras for cutting. Warehouse discounts range higher.
Washers 70 and 10 per cent off list Lock washers .6.00c, to 6.25c. Lock washers 80 per cent off list	Seamless Locomotive and Superheater Tubes Cents per Ft. Cents per Ft.
Lock wasners	2-in. O.D. 12 gage 15 2¼-in. O.D. 10 gage 20 3-in. O.D. 7 gage 35
Semi-Finished Castellated and Slotted Nuts	2-in. O.D. 11 gage 16 3-in. O.D. 7 gage 35 2-in. O.D. 10 gage 17 1½-in. O.D. 9 gage 15 2½-in. O.D. 12 gage 17 5%-in. O.D. 9 gage 55 2½-in. O.D. 12 gage 17
(Chicago and Pittsburgh) (To jobbers and consumers in large quantities)	2½-in. O.D. 11 gage 18 5½-in. O.D. 9 gage 57 Tin Plate
Per 1000 Per 1000	Standard cokes, per base box f.o.b. Pittsburgh district
14-in \$4.25 \$4.25 \$-in\$13.25 \$13.50	mills
78-111	Terne Plate (Per Package, 20 x 28 in.)
$\frac{7}{4}$ -ln	
Larger sizes—Prices on application.	12-lb. coating I. C 12.70 30-lb. coating I. C 17.35
Cap and Set Screws	15-10. coating 1. C 13.95 40-1b. coating 1. C 19.85
Milled hex. cap screws	Sheets (F.o.b. Pittsburgh district mills)
Upset hex, head cap screws, U. S. S. thread.	Nos. 9 and 10 (base), per lb2.60c. to 2.70c.
Upset hex, head cap screws S A E thread	Box Annealed, One Pass Cold Rolled No. 28 (base), per lb
Milled studs80 per cent off list	Automobile Sheets Regular auto body sheets, base (22 gage), per lb4.60c.
Rivets Large structural and ship rivets, base, per 100 lb\$2.60	No. 28 (base), per lb
Small rivets	No. 28 (base), per lb
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Prices of Raw Materials, Semi-Finished and Finished Products

Ores		Wire Products
Lake Superior Ores, Delivered Lower Lake Ports		Under the new selling plan of the American Steel & Wil
old range Bessemer, 55 per cent iron	4.90 ba 5.40 Bi	., fully explained elsewhere in this issue, five separa- sing points are provided, at Pittsburgh, Cleveland, Chicag rmingham and Worcester. See page 886.
Foreign Ore, per Unit, c.i.f. Philadelphia or Baltimor	re	
ron ore, low phos., copper free, 55 to 58 per cent iron in dry Spanish or Algerian 9.00c. to ron ore, Swedish, average 66 per cent iron		mi-Finished Steel, f.o.b. Pittsburgh or Youngstown per gross ton
fanganese ore, washed, 51 per cent manga-		lling billets, 4-in. and over
nese, from the Caucasus, nominal		lling billets, 2-in. and under 37.00 to 37.
ganese, from the Caucasus	400	rging billets, ordinary carbons 41.00 to 48.
anganese ore, Brazilian or Indian, nominal	490	eet bars, Bessemer
ungsten ore, high grade, per unit, in 60 per cent concentrates	Q1.	ibs 36.00 to 37.
hrome ore, basic, 48 per cent Cr ₂ O ₈ , crude,	W	re rods, common soft, base, No. 5 to %-in 46.
per ton, c.i.f. Atlantic seaboard 18.50 to		re rods, common soft, coarser than %-in\$2.50 over ba
olybdenum ore, 85 per cent concentrates, per lb. of MoS ₂ , New York		re rods, screw stock
		ire rods, carbon 0.41 to 0.55 5.00 per ton over bas
Ferroalloys		re rods, carbon 0.56 to 0.75 7.50 per ton over bas
erromanganese, domestic, 80 per cent, fur-		re rods, carbon over 0.75
nace, or seaboard, per ton \$90.00 to \$1	00.00	re rods, acid
erromanganese, foreign, 80 per cent, f.o.b. Atlantic port, duty paid	CII.	elp, sheared, per 1b
errosilicon, 50 per cent, delivered 72.00 to	00.00	elp, universal, per lb
	40.00	
errotungsten, per 1b. contained metal 87c. terrochromium, 4 to 6 per cent carbon, 60	o 90c.	
to 70 per cent Cr. per 1b. contained Cr.		Finished Iron and Steel, f.o.b. Mill
	0.75c. Rs	ills, heavy, per gross ton
rrochromium, 6 to 7 per cent carbon, 60 to 70 per cent Cr., per lb	U. 3 UC.	ils, light, new steel, base, lb 1.85c. to 1.90
rrovanadium, per lb. contained vanadium \$3.50 to	4 4	ils, light, rail steel, base, per lb 1.65c. to 1.70
errocarbontitanium, 15 to 18 per cent, per net ton		rs, common iron, base, per lb., Chicago mill 2.10 rs, common iron, Pittsburgh mill 2.40
TOTAL CONTRACTOR CONTR		il steel bars, base, per fb., Chicago mili
Iniogalaisan Passamar Farrasilisan and Silvary I	Co	ld-finished steel bars, base, Chicago, per lb. 2.70
(Per gross ton furnace unless otherwise stated.)	Gi	ound shafting, base, per lb
plegeleisen, domestic, 19 to 21 per cent\$31.00 to \$		t nails, base, per keg
piegeleisen, domestic, 16 to 19 per cent 30.00 to	32.00	
errosilicon, Bessemer, 10 per cent, \$89.50; 11 per cent, 12 per cent, \$44.50; 14 to 16 per cent (electric furn	nace).	Alloy Steel
\$36.00.	8	A. E. Series Bar
lvery iron, 5 per cent, \$27.00; 6 per cent, \$28.00; 7 per	cent, Ni	imbers 100
\$29.00; 8 per cent, \$30.50; 9 per cent, \$32.50; 10 per \$34.50; 11 per cent, \$37.00; 12 per cent, \$39.50.	21	00°(1/2% Nickel, 10 to 20 per cent Carbon)\$8.00 to \$3.
		00 (84% Nickel)
Fluxes and Refractories		00 (5% Nickel) 6.00 to 6. 00 (Nickel Chromium) 3.65 to 3.
uorspar, 80 per cent and over calcium fluoride, not		00 (Nickel Chromium) 5.50 to 5.
over 5 per cent silica, per net ton, f.o.b. Illinois and		00 (Nickel Chromium)
Kentucky mines		00 (Nickel Chromium)
uorspar, 85 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and		00*(Chromium Steel)
Kentucky mines		00 (Chromium Vanadium bars) 4.
r 1000 f.o.b. works:		00 (Chromium Vanadium spring steel) 4.25 to 4.
re Clay: High Duty Moderate		50 (Silicon Manganese spring steel) 3.50 to 3.
Pennsylvania		rbon Vanadium (0.48 to 0.85 Carbon, 0.15 Vanadium)
Ohio 40.00 to 43.00 37.00 to	39.00 NI	ckel Chrome Vanadium (0.60 Nickel, 0.50
Kentucky 42.00 to 43.00 37.00 to Illinois		Chromium, 0.15 Vanadium) 4.25 to 4.
Missouri 42.00 to 45.00 35.00 to	40.00	mium, 0.25-0.40 Molybdenum) 4.25 to 4.
Ground fire clay, per net ton 6.00 to	7.00 Cl	romium Molybdenum bars (0.50-0.70 Chro-
lica Brick:	25.00 C	mium, 0.15—0.25 Molybdenum) 3.78 to 4.
Pennsylvania	00.00	Chromium, 0.30-0.50 Molybdenum) 4.75 to 5.
Birmingham	50.00	Above prices are for hot-rolled steel bars, forging quali-
Ground silica clay, per net ton 7.50 to		r 100 lb., f.o.b. Pittsburgh. For billets 4×4 to 10×10 - e price for a gross ton is the net price for bars of the sai
agnesite Brick: Standard size, per net ton (f.o.b. Balti-		alysis. For billets under 4 x 4-in, down to and includi
more and Chester, Pa.)		5-in. squares, the price is \$5 a gross ton above the 4 x
rain magnesite, per net ton (f.o.b. Balti-	40.00 bi	llet price.
more and Chester, Pa.)	20,00	Not S.A.E. specifications, but numbered by manufa
Standard size, per net ton	45.00 tu	rers to conform to S.A.E. system.
	005	

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FABRICATED STEEL BUSINESS

Awards Totaling 18,875 Tons, About on Par With Preceding Week-12,000-Ton Job Up for Bids

Structural steel awards of the past week totaled 18,875 tons, which was but little over a hundred tons more than awards in the previous week. Awards included one job of 5000 tons, an office building to be erected at Columbus, Ohio. Most of the other projects were small. Except for 12,000 tons inquired for for a new hotel in New York, inquiries for structural steel are light, the total including this 12,000 tons being only 24,850 tons, and the greater part of this is in only six projects. Awards are:

Libby Baths, Delancey and Chrystie Streets, New York, 1100 tons, to Hinkle Iron Co.

New York Edison Co., sub-station on Ninety-fourth Street, Manhattan, 400 tons, to Hay Foundry & Iron Works. Pelham High School, Pelham, N. Y., 130 tons, to Lehigh

Structural Steel Co.

Apartment building, West Fifty-fifth Street, New York, 400 tons, to Drier Iron Works.

Apartment building, Park Avenue, New York, 700 tons, George A. Just Co.

Forstmann & Huffman Co., silk mill at Garfield, N. J., 300 tons, to American Bridge Co.

Atlantic Coast Line Railroad, girder spans, 230 tons, to McClintic-Marshall Co.

Federal American National Bank, Washington, 550 tons, to Barber & Ross.

Central Railroad of New Jersey, bridge at Summerville,

N. J., 150 tons, to Shoemaker Bridge Co. Philadelphia Electric Co., turbine foundations for power plant, 300 tons, to Shoemaker Bridge Co.

Hospital, Englewood, N. J., 400 tons, to Bethlehem Steel

Bridge over Brandywine Creek, Wilmington, Del., 225 tons, to Chesapeake Iron Works.

Havemeyer telephone station of New York Telephone Co., New York, 200 tons, to Eidlitz & Ross.

Penn Hardware Co., Reading, Pa., warehouse, 100 tons, to Jones & Laughlin Steel Corporation.

Kier Fire Brick Co., Salina, Pa., sheds, 100 tons, to Jones & Laughlin Steel Corporation.

General Tire & Rubber Co., Akron, Ohio, plant extensions, 400 tons, to Berger Iron Works.

American Insurance Union, 18-story office building, Colum-

bus, 38-story tower 520 ft. high, 5000 tons, to McClintic-Marshall Co.

Fort Meigs Hotel, Toledo, 400 tons to the Donovan Wire & Iren Co.

Milwaukee Sewerage Commission, sludge storage building, 600 tons, Milwaukee Structural Steel Co. low bidder at \$49,480, bids opened Sept. 26.

Chesapeake & Ohio Railroad station at Ashland, Ky., tons, general contract to Joseph E. Nelson & Sons,

Dixie Construction Co., Birmingham, I-beams, 100 tons, to Virginia Bridge & Iron Co.

Standard Club building, Chicago, 2500 tons, to Gage Structural Steel Co.

W. J. Holliday & Co., warehouse, Indianapolis, 1000 tons, to Central States Bridge Co. and Insley Mfg. Co.
Franklin Street Building Corporation, garage and office building, 333 South Franklin Street, Chicago, 337 tons, to Midland Structural Steel Co. Dwight L. Moody Memorial Church, Chicago, 300 tons, to A. Bolters Sons.

Iowa Highway Commission, spans at Rome, Iowa, 237 tons, to Des Moines Steel Co.

Nye Tool & Machine Works, factory building, Chicago, 116 tons, to A. Bolters Sons

Pennsylvania Railroad, bridge, 150 tons, to Bethlehem Steel Co.

Reading Railroad, bridge, 100 tons, to Bethlehem Steel Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

Hotel to be built by the Dupont-Boomer interests on the site of the Savoy Hotel, Fifth Avenue at Fifty-ninth Street, New York, 12,000 tons.

Carolina Department of State building, Raleigh, N. C., 300 tons. Seminary, Hartford, Conn., 300 tons.

Security Insurance Co., office building, New Haven, Conn.,

School, Newark, N. Y., 150 tons.

Office building, northeast corner of Madison Avenue and

Fortieth Street, New York, 3500 tons. St. Joseph's Hospital, Reading, Pa., addition, 250 tons. Seamen's Church Institute, 25 South Street, New York, 1000 tons.

Woodrow Wilson High School, New Rochelle, N. Y., a few

hundred tons.

Columbus Railway, Light & Power Co., Columbus, Ohio, new power plant near Columbus, 1500 tons, deferred until next spring.

Smith Brothers Hardware Co., Columbus, warehouse, 800 tons, bids to be taken shortly.

Great Northern Railway, bridge work, 2000 tons.

Chicago & North Western, bridges and ore chutes, 1700

Detroit City Gas Co., two buildings, Detroit, 150 tons. Norristown-Penn Trust Co., Norristown, Pa., 600 tons.

RAILROAD EQUIPMENT BUYING

A Good Deal of Car Purchasing in Prospect for This Month—Reading Buys 2000

Freight-car buying by the railroads promises to show a considerable increase this month. Purchases tentatively figured on by the carbuilders include 10,000 for the Sante Fe, 8000 for the Baltimore & Ohio, 3000 for the Atlantic Coast Line, 2050 by the Great Northern and 2500 by the Chicago & Northwestern. The Reading, which has just ordered 2000 cars, is expected to buy another thousand this week. The Missouri Pacific has ordered 50 locomotives and the New York Central is getting bids on 15 to 40.

The Reading has ordered 2000 of the freight cars for which it recently inquired and the other 1000 will probably The Pressed Steel Car Co. bought this week. Bethlehem Steel Co. will each build 500 70-ton gondolas and the American Car & Foundry Co. and the Standard Steel Car will each build 500 50-ton box cars.

The New York Central Railroad has inquired for bids on the conversion of old box cars into 100 to 200 flat cars and 100 to 200 stock cars.

Expected inquiries from the Baltimore & Ohio, for 8000 cars, and from the Atlantic Coast Line, for 3000, have not yet been received by car builders.

The Missouri Pacific has ordered 50 locomotives, 35 from the American Locomotive Co. and 15 from the Baldwin Locomotive Works.

The New York Central is inquiring for 15 to 40 passenger locomotives.

The Gulf Coast Lines have placed 250 gondola cars with the Mount Vernon Car Mfg. Co., 500 box cars with the American Car & Foundry Co., and 500 automobile cars with the Pullman Car & Mfg. Corporation.

The Great Northern program calls for 2050 cars, of which 600 gondola, 200 box and 100 flat cars will be built in its own shops, while it is undecided whether it will build 900 automobile cars in its own shops or place them outside. It has issued inquiries to car builders for 250 ore cars and has placed 600 underframes with the Pullman Car & Mfg. Corporation.

The Santa Fe contemplates buying 10,000 freight cars The Chicago & Northwestern expects to enter the market

for 2500 freight cars.

The Pere Marquette has placed 12 underframes for caboose cars with the Pressed Steel Car Co. The Missouri Pacific has ordered 75 caboose cars from the

American Car & Foundry Co. The Union Refrigerator & Transit Co. has placed 200

underframes for caboose cars with the American Car & Foundry Co.

The Mill Power Supply Co. has ordered 10 50-ton flat cars from the Kilby Car & Foundry Co.

Reflecting the depression in the New England foundry industry, especially among the textile machinery makers, a further curtailment has become effective at the Whitin Machine Works, Whitinsville, Mass. foundry has been operating four days a week with an average melt of 15 tons daily, with 10 per cent of its operating force. It has gone on a three-day per week schedule.

NON-FERROUS METALS

The Week's Prices

Cents per Pound for Early Delivery

Copper, New York		Straits Tin La (Spot)		end	Zinc		
Sept.	Lake	Electro- lytic*	New	New York	St. Louis	New York	St. Louis
24 25 26 27	13.12 1/4	12.75	47.00 47.20 47.50	8.00 8.00 8.00 8.00	7.80 7.80 7.80 7.80	6.45 6.50 6.52 1/3 6.50	6.10 6.15 6.17 1/2 6.15
30			48.00 48.25	8.00	7.80	6.50	6.15

*Refinery quotation; delivered price \(\)c. higher.

New York

NEW YORK, Sept. 30.

All the markets are exceedingly quiet with the price trend downward in all but tin. Copper prices have softened and lead is slightly easier with buying extremely light in both. The tin market is only moderately active with prices higher than last week. Changes in prices of

zinc have been slight in a dull market.

Copper.—The copper market is deadlocked, buyers not being willing to enter the market and sellers not willing to sell at present quotations. Prices which are asked are largely nominal, with electrolytic copper quoted at 13c., delivered, and with a little metal here and there available at 12.87½c., delivered. While consumers covered their requirements quite fully on the last buying movement, it is the opinion of some that their stocks are not large and that they must soon enter the market. A change in prices one way or the other would probably start fresh buying. Under present conditions the market is extremely dull with inquiry and sales at a low point and with export demand at a low ebb. Lake copper is quoted at 13.12½c., delivered. Copper Averages.—The average price of Lake cop-

Copper Averages.—The average price of Lake copper for the month of September, based on daily quotations in THE IRON AGE, was 13.39½c. The average price of electrolytic copper was 12.97c., refinery, or

13.22c., delivered.

Tin.—During the past two weeks a prominent London operator has been very active in his speculative drives on the market. Very recently he has met strong opposition and on two or three days last week opposing interests bought the metal as fast as he sold it. The contest is being watched on this side with interest and the opinion prevails that the buying was either for the principals involved or for a pool. In any event the prominent operator referred to was temporarily stopped, having been taken by surprise. Reports are now to the effect that he is trying to buy back what he sold. The trade here is gratified at the present situation because his manipulations were decidedly unsettling. Early in the last week one dealer in the market here was an active seller and consumers have been buying only when There have also been constant bids they needed tin. from London dealers because at times this was the cheapest market. Total sales for the week are estimated at 700 tons. Deliveries into consumption for the month of September have been 4985 tons. Stocks on Sept. 30 are reported as 2374 tons, with 1600 tons landing, or a total of 3974 tons in stock and landing on Sept. 30. Spot Straits tin today was quoted at 48.25c., New York, in a dull market. London quotations today were about £12 per ton higher than a week ago, with spot standard quoted at £239 5s., future standard at £241 5s., and spot Straits at £240 5s., with the Singapore quotation yesterday at £240 15s. Arrivals thus far this month have been 5505 tons, with 5460 tons re-Arrivals thus ported afloat.

Lead.—This market is quiet with the prices in the outside market slowly sagging. Practically all sellers, including the leading interest, are taking business at Sc., New York. The general market, however, cannot be termed weak and shipments into consumption are very heavy. The St. Louis market is a little lower, due to offerings from second hands, with quotations ranging

from 7.80c. to 7.85c. Some say that business can be done at that point as low as 7.75c.

Zinc.—This market is more or less stagnant, very little inquiry appearing and very few transactions being reported. When quotations reached 6.10c., St. Louis, a few days ago there was some active inquiry, but since then this has disappeared. The galvanizers who might have bought then have withdrawn and producers who might sell at present prices are not pressing the market, their costs being high. Prime Western zinc is quoted today at 6.15c., St. Louis, or 6.50c., New York.

Nickel.—Quotations for shot and ingot nickel are unchanged at 27c. to 28c. per lb., with electrolytic nickel held at 31c. to 32c. by leading producers.

Antimony.—Chinese metal for spot delivery is firm in a dull market at 11.25c. per lb., duty paid, in a dull market. Prices are largely nominal.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at 27c. to 28c. per lb., duty paid, delivered.

Old Metals.—The market continues sluggish with little business. Dealers' selling prices are as follows in cents per lb.:

Copper, heavy and crucible	12.50
Copper, heavy and wire	11.75
Copper, light and bottoms	
Heavy machine composition	
	8.00
Brass, light	6.50
No. 1 red brass or composition turnings	9.00
No. 1 yellow rod brass turnings	7.75
Lead, heavy	7.125
Lead, tea	6.00
Zine	
Cast aluminum	17.50
Sheet aluminum	17.50

Chicago

SEPT. 30.—Copper, lead and zinc have declined, while tin has advanced. Both copper and lead are very quiet and, while the trade as a whole shows little interest in present low prices, some observers regard copper as a particularly good buy. Zinc is steady but dull at the lower quotation. Tin has recovered from recent weakness and is firm. Old metal prices are unchanged. We quote in carload lots: Lake copper, 13.25c.; tin, 49c.; lead, 7.85c.; spelter, 6.20c.; antimony, 12.50c., in less than carload lots. On old metals we quote copper wire, crucible shapes and copper clips, 10.25c.; copper bottoms, 9c.; red brass, 8.25c.; yellow brass, 7c.; lead pipe, 6.75c.; zinc, 4c.; pewter, No. 1, 24c.; tin foil, 30c.; block tin, 38c., all buying prices for less than carload lots.

AMERICAN EXPORTS AND IMPORTS

Iron and Steel and Machinery Figures for August

WASHINGTON, Sept. 29.—Exports of iron and steel products in August amounted to 134,623 gross tons. compared with 137,481 tons in July and with 161,426 tons in August of last year. The current figures were the smallest since last April, when they stood at 131,276 tons. For the 8 months of the year the total was 1,255,963 tons, compared with 1,302,995 tons for the corresponding period of last year.

Imports of iron and steel amounted to 44,928 tons, a considerable increase over the 30,410 tons in July and almost equal to the 45,439 tons of August last year. The chief items of increase over July were in pig iron, with a total of 16,189 tons, scrap with 7027 tons and steel rails with 9034 tons. For the 8 months, imports this year have been 365,633 tons, compared with 614,726 tons last year. The decreases have been in almost all of the large items, pig iron exports having fallen more than half and acrap almost three-fourths from the high figures of last year.

Exports of machinery in August were \$30,286,511, compared with \$23,382,472 in July and with \$27,940,665 in August last year. For the 8 months of the year machinery exports have been \$216,188,635, compared with \$188,909,876 last year.

Details will appear in THE AGE IRON next week.

PERSONAL

Capt. Ralph Earle, U.S.N., who as rear-admiral was chief of ordnance of the Navy during the world war, and who is now commander of the torpedo station at Newport, R. I., has been invited by the trustees of the Worcester Polytechnic Institute, Worcester, Mass., to become the president of that institution, to succeed Dr. Ira N. Hollis, who has resigned. Captain Earle is expected to accept if the necessary arrangements with the Navy Department can be made. He is a native of Worcester and spent his boyhood there, and was him-self a student at Worcester Polytechnic when he was appointed to the Naval Academy. He is 50 years old. Captain Earle has had a varied and notable career in the Navy, including several periods as a member of the Annapolis faculty.

Charles M. Schwab, chairman Bethlehem Steel Corporation, is to be guest of honor at a celebration under the auspices of the Homestead Chamber of Commerce at Homestead, Pa., on Oct. 10. It will be recalled that in his early days Mr. Schwab was general superintendent of the Homestead Steel Works, in which capacity he played an important part in the early growth of that community. The celebration is to mark the growth of Homestead from a small mill town to a business, industrial and residential district, with a population of almost 50,000, with industrially invested capital of more than \$41,000,000 and annual payrolls exceeding \$15,000,000.

William Schwanhausser, chief engineer of the Worthington Pump & Machinery Corporation, was guest of honor at a dinner given recently by company officials in honor of his seventieth birthday and to mark his fortieth year of continuous service with the organization. Mr. Schwanhausser is a native of Bavaria and a graduate of the Polytechnic Institute of Mittweida. Upon reaching this country he became associated with the Otis Elevator Co. and after eight years with the company, became assistant superintendent of the pump works of Henry R. Worthington. From 1901 to 1906 he was general manager of Henry R. Worthington and since 1906 has served as chief and consulting engineer of the International Steam Pump Co., later merged into the present Worthington Pump & Machinery Corporation.

Charles G. Atha, director of Stewart & Lloyds, Ltd., Glasgow, is now in the United States visiting a number of plants in iron and steel centers.

Walter J. Willis, superintendent of the Depew, N. Y., works of the Gould Coupler Co., Inc., is in Europe, his itinerary including a number of steel foundries in France and Germany.

Evan F. Jones, recently with the Wickwire Spencer Steel Corporation and with the Morgan Construction Co., has been made general manager of the Atlas Die Casting Co., Worcester, Mass., and has entered upon his new duties. A. W. Hutton remains with the company as chief engineer.

Frank A. Wilch, who has been associated with the Cleveland office of the Triumph Electric Co., Cincinnati, builder of motors, has been placed in charge of that territory. He succeeds Edward S. Ford.

J. William Jones, for the past 20 years designing engineer at the Painted Post, N. Y., plant of the Ingersoll-Rand Co., was resigned and will become assistant chief designing engineer with the Buick Automobile Co., Flint, Mich.

Ward F. Pattengell has resigned as assistant to the president of the United Machine & Mfg. Co., Canton, Ohio. to engage in the insurance business in Youngs-Ohio, to engage in the insurance business in town. He was formerly credit manager of the Brier Hill Steel Co., Youngstown, until its absorption by the Youngstown Sheet & Tube Co.

L. A. Babcock, for the past nine years sales manager of the Byers Machine Co., Ravenna, Ohio, has resigned and, while giving up active association with the company, he retains his financial holdings there. The change will allow him to devote time to his growing outside interests.

J. H. Keegan has severed his connection with the Advance Furnace & Engineering Co., Springfield, Mass., and has been appointed manager of sales for the Economy Furnace Co., Chicopee, Mass. Prior to his connection with the Advance company he was with the Gilbert & Barker Mfg. Co., Springfield, as assistant sales manager.

Dr. George Schlesinger of the Technical University, Charlottenburg, Germany, and director of the machine tool laboratory of the Machine Tool Builders' Association of Germany, is in the United States and was a visitor at the recent New Haven machine tool exhibition. Dr. Schlesinger will visit many of the machine tool plants of this country. He was formerly connected in an engineering capacity with Ludwig Loewe & Co. of Germany. The German machine tool association, Dr. Schlesinger said, employs a considerable staff in research work and is now spending about \$40,000 a year on research.

Col. R. A. Mitchell, vice-president Alabama Power Co., has been appointed to succeed W. S. Hotchkiss as president of the Anniston Electric Steel Corporation, Anniston, Ala., producer of electric steel castings, forgings, valves, mine cars, etc. James Duger will be general manager of the company. Colonel Mitchell will direct affairs from his office in Birmingham.

R. Trimmer, until recently with the Cyclops Steel Co., and previously with the Vanadium Alloys Steel Co., Latrobe, Pa., and before that, with the Latrobe Electric Steel Co., Latrobe, has been appointed to take complete charge of the Chicago office and warehouse of the Jessop Steel Co., Washington, Pa., at 609-13 Fulton Street, where full stocks of tool-steel bars, and also shapes and plates will be carried. R. K. Greaves, formerly with the Cyclops company, has been appointed district manager in charge of the newly opened Detroit office at 2208 Fort Street, West.

H. J. Hair, for the last two years sales engineer in Philadelphia for the Lawson Co., and prior to that, about 12 years with Manning, Maxwell & Moore, Inc., New York, the last two years of which he was Pittsburgh district sales manager, has been made district sales manager in Philadelphia for the Dow Co., maker of gravity and power conveyors, Louisville, Ky. His headquarters will be at 605 Fox Building.

October Meeting of the American Iron and Steel Institute in New York

The twenty-sixth general meeting of the American Iron and Steel Institute will be held at the Hotel Commodore, New York, on Friday, Oct. 24. There will be the usual sessions, morning and afternoon, at which Judge Gary will give his address and technical papers will be read. This will be followed by a banquet in the

The papers to be read at the morning and afternoon sessions will be as follows:

Blast Furnace Practice in the Birmingham District, R. H. Ledbetter, Tennessee Coal, Iron & Railroad Co., Birmingham.
The Constitution of Iron Blast Furnace Slags, Prof.
Richard S. McCaffery, University of Wisconsin, Madison.
The Manufacture of Tin Plate in India, Frank L. Estep,
Perin & Marshall, New York.

The Manufacture of Slag Brick and Other Slag Products, C. E. Ireland, Birmingham Slag Co., Birmingham. Iron and Steel Scrap (commercial paper), W. Vernon

Phillips, Perry-Buxton-Doane Co., Philadelphia.

Iron and Steel Scrap (metallurgical paper), E. T. Lowry, Hickman, Williams & Co., Chicago.

New York Steel Treaters

The New York chapter of the American Society for Steel Treating will hold its first meeting this fall on Wednesday evening, Oct. 22, instead of Oct. 15, the usual date. F. F. Lucas, the Howe medalist for 1924, will give an illustrated lecture on high power photomicrography.

OBITUARY

B. F. Bourne

Benjamin Franklin Bourne, chairman of the board of the Bourne-Fuller Co., Cleveland, for a long time one of the most prominent men in the iron and steel in-



B. F. BOURNE

dustry in that city and one of Cleveland's leading citizens, died suddenly Sept. 27, being stricken with heart failure in his home. He had been in his usual good health and the news of his passing away was a severe shock to many friends. Mr. Bourne was 63 years of age and had been connected with the iron and steel industry in Cleveland 45 years. Starting his career without the advantages of wealth or a college education, he succeeded by his energy and ability in working through minor positions until he became the head of a large steel company. He was born March 28.

1861, at Hyannis, Mass., and in 1874 his parents moved to Cleveland. After his graduation from West High School he entered the employ in 1879 of W. H. McCurdy & Co., dealers in iron and steel. In 1883 he became a traveling salesman for Condit, Fuller & Co. That firm was succeeded by the Condit-Fuller Co. in 1890 and Mr. Bourne became its president in 1893. In 1895 the company was reorganized as the Bourne-Fuller Co. and Mr. Bourne was chosen president, remaining as its active head until 1920, when he became chairman of the board. Under Mr. Bourne's leadership the Bourne-Fuller Co. became an important manufacturer as well as a jobber in steel. In 1911 the company acquired control of the steel plant and bolt and nut works of the Upson Nut Co., and in 1918 merged the Upson Company and the Union Rolling Mill Co., Cleveland, which had become an affiliated interest, in the Bourne-Fuller Co., the two other companies giving up their separate corporate identity. H. A. Fuller, with whom Mr. Bourne was closely affiliated in the Bourne-Fuller Co. for many

years, died last February.

Mr. Bourne was prominent in various civic activities in Cleveland. He was a director of the Lake Division of the Red Cross during the war, a trustee of Lakeside Hospital, active in the Community Chest campaign and in the Cleveland Chamber of Commerce. He was a member of the Union, Country, Mayfield, Tavern and Chagrin Valley Hunt Clubs, of Cleveland, and of the American Iron and Steel Institute. Since he had become chairman of the board he had been devoting only a portion of his time to business, giving much time to the various recreations in which he took a deep interest, including hunting, fishing and golf. He is survived by his widow, one daughter and two brothers, Henry K. Bourne, vice-president of the Oglebay Norton Co., and Arthur C. Bourne of the Bourne-Fuller Co.

W. H. PICHER, Joplin, Mo., formerly prominently identified in the lead smelting industry of southwest Missouri, died in St. Louis, Sept. 15, at the age of 74. Mr. Picher was one of the organizers of the Old Picher Lead Co., Joplin, later merged with the Eagle Paint Co., Cincinnati, as the Eagle-Picher Lead Co. He retired from active business about ten years ago.

JOSEPH C. SMITH, president Weldit Acetylene Co., Detroit, died on Sept. 18.

ALLEN W. ELLENBERGES, long identified with various metal working and other industries in Cleveland, died

at his home in that city, Sept. 27, aged 71 years. He had been in poor health several months. Mr. Ellenberger was formerly president and later chairman of the board of the Hydraulic Pressed Steel Co. He was also one of the founders of the Worden Tool Co. and was president of that company until his death. He was vice-president of the Cleveland-Buffalo Transit Co. and interested in other industrial companies and various Cleveland banks. He was born in Canal Dover, Ohio, and had lived in Cleveland since he was 16 years of age.

Stephen Moltrup, secretary-treasurer Moltrup Steel Products Co., Beaver Falls, Pa., died in that city Aug. 27.

Karl S. Harbaugh

KARL S. HARBAUGH, for several years district manager of sales for the United States Steel Products Co. at Seattle, Wash., died at his home in that city on

Sept. 19, after an illness of two months. Mr. Harbaugh was born in Pittsburgh 51 years ago. He received his early education in that city and also in St. Paul, to which city his family moved later. He was graduated from the Massachusetts Institute of Technology. Mr. Harbaugh lived in San Francisco for a time and then went to Portland in 1893 to become a traveling salesman for Pogue & Smith, iron and steel factors of Portland, selling the products in several Western States of the Carnegie Steel Co., National Tube Co., American Sheet Steel Co., American Tin Plate Co. and Amer-



K. S. HARBAUGH

ican Bridge Co., all of which were merged into the United States Steel Corporation in 1901. With this readjustment, Mr. Harbaugh discontinued the selling arrangement with Pogue & Smith, and entered the employ of the Steel Corporation in Seattle. When the United States Steel Products was organized he was made sales agent in the Seattle district for all its products with the single exception of wire goods made by the American Steel & Wire Co. Mr. Harbaugh was well known and was regarded highly in steel circles in the Pacific Northwest.

Cash registers and calculating machines produced in 1923, according to the Census Bureau, amounted to \$95,105,570 from 37 establishments, compared with \$53,652,943 from 49 establishments in 1921. The number of wage earners increased from 9786 to 14,971, and their wages from \$13,243,471 to \$22,774,197. The horsepower used in 1923 was 29,852, while 19,010 net tons of coal was consumed. A noteworthy feature was the high proportion of the value added by manufacture to the value of the product. In 1921 the figure was \$44,080,115, or 82.2 per cent of the value of products. A still higher percentage was reached in 1923 at 86.9, when the value added by manufacture was \$82,622,442.

Ventilating equipment for the new Palmer House in Chicago is to be supplied by the Clarage Fan Co., Kalamazoo, Mich. Included are 30 centrifugal exhausting fans capable of handling 25 tons of air per min. and 21 fresh air fans capable of handling 19 tons per min—the latter being passed through an air washer and cleanser. The cleansing system will furnish air at 70 deg. Fahr. The fans will range in size from 2 ft. to 12 ft. in diameter and will supply a balanced air circuit wherever needed in the hotel.

LOW PRICES AT SEATTLE

Eastern Mills Make Concessions in Plates and Other Materials

SEATTLE, Sept. 26 .- With the single exception that inquiry is still showing some gain, the situation here in the steel trade remains practically the same as it has been for some months past, and the general opinion is that it will not show much change until after the presidential election. Both jobbers and consumers are buying guardedly, and while their stocks are badly broken, and have been for some months, they show no signs of buying for future needs. They figure that with the great capacity of this country to make steel, there will be no trouble in getting fairly prompt shipments when they decide the time has come to replenish their very low stocks. Local jobbers and warehouses can get deliveries from Eastern mills in three to four weeks, while on some steel items, local supplies are available and from the Colorado company, two weeks or less has been done by the railroads on delivery in this district. The policy of buying for actual needs only is likely to continue well up to the close of the

Competition More Severe

The price structure here is no stronger than it has been since the market started to decline last March, in fact, in the past two weeks or so, competition seems to be getting more severe, and prices being made by some of the Eastern steel mills are lower than at any time this year. Concessions are still obtainable when any worth while business comes in the market, but it is also true that several of the Eastern steel makers have minimum figures for Seattle delivery, under which their local sales representatives are not allowed to go. On two fairly large structural jobs placed recently, it is said that prices at which the work was taken did not allow any profit, the fabricators who are doing the work saying that they wanted to keep their organization together.

The announcement from the East of a reduction of \$2 per ton in prices of cold-rolled shafting has helped to further unsettle prices here, local jobbers saying they look for further reductions on other steel products in the near future.

Shapes Are Weaker

Within the past two weeks, structural shapes have shown further weakness in the local market, and as low as 2.40c. delivered here has been done by two Eastern makers. This price figures back to about 1.65c. at mill, and is the lowest named in this market for several years. No large jobs have come up here for some time and none is in sight. The Pittsburgh-Des Moines Steel Works, fabricator, with plants Pittsburgh and Des Moines, Iowa, was the low bidder on about 500 to 600 tons of small shapes for transmission towers for a Tacoma interest, but all bids were rejected, and new bids will be asked for in a short time. Some low prices went in on this work, and the rejection of all bids was a surprise. Contracts were placed for the tower foundations, so that the steel shapes will be needed later. Prices on plain material here may be quoted at 2.40c, to 2.50c, to jobbers and warehouses, and from 3c. to 3.25c. to the retail buyer.

Plates of tank quality are down to 2.30c. for ¼-in. and heavier, with demand quiet and for small lots only. This price is equal to about 1.55c. at Pittsburgh mill. The city of Seattle is concreting a large number of its streets, and is replacing old water lines made of wooden pipe with either steel or cast iron pipe, and the city will shortly advertise for bids on about 30,000 ft. of steel pipe. It is expected that some low prices will be made, as this is the largest inquiry to be figured on in a long time. Plans are being made in the city engineer's offices, and bids will be asked shortly after Oct. 1. The Worth Steel Co., Claymont, Pa., is a new seller of plates in this market, the company having a water rate of 10c. from mill to tidewater, and 41c. by water to

Seattle as against a total rate of 71c. from Pittsburgh

The market on steel bars is very light, but for reinforcing bars is fairly active, due to the large amount of new building that has been going on in Seattle for some months. The local maker is still quoting steel bars at 2.50c. delivered to Seattle warehouse, and is getting a good part of the business going in the sizes it makes. To the small buyer, from 3c. to 3.25c. is being quoted.

Fair Orders for Sheets

Some fair orders for sheets are being placed, prices being on the basis of 2.70c. for blue annealed, 3.50c. for 28 gage black and 4.60c. for 28 gage galvanized, all these prices f.o.b. Pittsburgh mill. No foreign inquiry for sheets of any consequence has come in this market for some time, the large inquiries from Japan and other foreign countries going direct to the Eastern mills.

Tin plate here is quiet, but within the next 60 days, inquiries are expected to come out from the fish packers for their needs of tin plate for 1925. This business is usually placed in November or early in December each year.

A sale of 1000 boxes of tin plate for Japan was closed here last week, taken by the local representative of a Pittsburgh maker. The price is said to have been \$5.90 per base box, delivered Japan. If this price was made, it figures back to about \$4.80 at mill. On tin plate for export, there is a freight of 65c. for rail and water, 10c. for double strapping, 30c. for tin lining and 3c. other charges, or a total of \$1.08 in carrying charges, all of which are paid by the seller.

A report is current here that a local importer has about made plans for importing close to 10,000 tons of finished steel products from Germany into Seattle, and that, within a short time, all this material will be on the way here. Confirmation of this cannot be obtained.

Increased Mill Activity at Buffalo

BUFFALO, Sept. 30.—Steel mill operation throughout the district is on an improved plane. The Lackawanna plant of Bethlehem Steel Co., has 13 open hearths in operation and two Bessemer furnaces. Mills are all running except the plate mill and before October, it is expected operations will be about 60 per cent of finishing capacity. No. 5 mill (plate) will be ready for operation the first week in October, following extensive alterations. including electrification.

extensive alterations, including electrification.

The Donner Steel Co. has four of its nine open hearths operating, and before October is far extended, is expected to be operating 65 per cent of its finishing mill capacity.

The Seneca Iron & Steel Co. is operating eight sheet mills and the Wickwire-Spencer Steel Corporation is said to be on a 45 to 50 per cent of capacity operation.

In the blast furnace field, Lackawanna has five of nine stacks in blast; Donner Steel Co., Hanna Furnace Co., and Rogers-Brown Iron Co., two furnaces each. The Wickwire-Spencer Steel Corporation has both of its blast furnaces down. The Tonawanda Iron Corporation, subsidiary of the American Radiator Co., is expected to have its renovated stack in blast before the middle of October.

Proposed Steel Works in Chile

The Electrical Equipment Division, Bureau of Foreign and Domestic Commerce, Washington, has received information from William M. Collier, ambassador, Santiago, Chile, regarding the organization of the Compania Electrica Siderurgica y Industrial de Valdivia at that place, which plans for the construction and operation of a local steel works, with electric furnaces, etc., to develop an initial annual capacity of 30,000 tons. Final concessions are being secured from the Government for the new mill.

NEW TRADE PUBLICATIONS

Safety Clatches and Brakes.—Cutler Hammer Mfg. Co., Milwaukee. Illustrated bulletin No. 3127, describing the C-H magnetic safety clutches and brakes in rubber mills where they are used to secure quick stoppage of mixing and cracking rolls, washers and calenders when accidents occur. The clutch-brakes are adapted for use on rotating machinery that must be stopped instantly, either as a regular feature of operation or in an emergency.

Roller Bearings for Coal Mine Cars.—Hyntt Roller Bearing Co., Newark, N. J. Bulletin No. 890 of 16 pages shows various types of roller bearing axies for mine cars, most of which are entirely inclosed, because of the dust to which the bearing otherwise would be subjected. The bulletin gives some indication of the necessary care to keep the bearings in shape and shows results of tests.

Ventilators.—Swartwout Co., Cleveland. Booklet of 26 pages, eighth edition, bearing the title of "The Gospel of Fresh Air." Ventilation in general is discussed, and the company's rotary ball bearing ventilators, which are available in sizes from 8 to 72 in., are briefly described and illustrated. Pages are devoted to installations of the ventilators in heat treating and drop forge plants, boiler and engine rooms and a variety of other plants and buildings. Information on the testing of ventilators is given and also specifications for both ventilators and bases. The booklet is attractively arranged and contains a wealth of information.

Power Plant Equipment.—Swartwout Co., Cleveland. Booklet of 56 pages describing the features of the company's steam traps, cast-iron exhaust heads, steam, oil and air separators, feed water heaters and other power plant equipment. Illustrations are numerous and include outline drawings. Dimensions and other data are given.

Double Helical Gear Units.—Lewis Foundry & Machine Co., Farmers Bank Building, Pittsburgh. Booklet of 16 pages describing and illustrating its double helical gear units. Gear units of this sort of 200 hp. to 2000 hp. are illustrated, as well as herringbone and other types of gears. Lubrication and ruggedness without excessive weight are stressed in the descriptive matter, as is also the care given the design and manufacture of fly-wheels.

Motor Valves.—Oakley Valve Co. of Connecticut, Inc., Shelton, Conn. Price list of Monel metal valves for automotives, trucks and tractors.

Mold Dryers.—T. Ketin & F. Thiriart, Sclessin-near-Liege, Belgium. Leafiet illustrating some of the portable coke burning dryers equipped with fans and designed to dry molds of a variety of castings, particularly those of large and intricate shape. The leafiet is printed in English with English dimensions, indicating that the company is desirous of supplying the American market.

Turbe-Blowers and Compressors.—Ingersoil-Rand Co., 11 Broadway, New York. Twelve-page picture book, 11 x 8½ in., showing installations of turbe-blowers in iron and steel plants, as well as in public utility plants, in various portions of the United States. These blowers are available for low and medium discharge pressures from 1 to 30 lb. per sq. in., and in sizes ranging from 3000 to 80,000 cu. ft. of free air per min.

High-Speed Fans.—American Blower Co., Detroit. Thirty-six page bulletin No. 1103, devoted to a centrifugal type fan with impelier blades curved backward from the direction of rotation. The catalog is well illustrated and more than two-thirds of the pages are taken up with tabular matter covering capacities, dimensions, speeds, powers, etc.

Practical Handbook for Automobile Repairmen.—L. S. Starrett Co., Athol, Mass., Vol. III, Starrett Book for Motor Machinists and Auto Repairmen, just issued, is a companion for Vols. I and II of Starrett books—those for Machinists' Apprentices and the Data Book for Machinists. The new book contains 215 pages and is profusely illustrated. It is published in recognition of the growing importance of machine and precision tools in automobile service and repair shops. The whole purpose is to aid the man in the service station or repair shop to gain a better understanding of the uses, methods of operation and the value of machine and precision tools as applied to modern automobile main-

tenance and repair work. Vol. III sells for 75c. at hard-ware, accessory and machinists' supply stores.

Heating Machine.—Gibb Instrument Co., Bay City, Mich. Two-page folder devoted to a machine for heating metals electrically in preparation for welding, brazing, soldering, punching, forging, bending and stamping.

Boilers.—Union Iron Works, Erie, Pa. Booklet giving detailed description of the design and construction of the company's new universal boiler, specially adapted to small floor space. Interior, exterior and cross-section views are shown. Dimensional data are given.

Ampere-Hour Meters.—Sangamo Electric Co., Spring-field, Ill. Sixteen-page folder showing ampere-hour meters for train lighting systems, giving illustrations of various features of the meters, together with the dials. The meters are featured both for axie-generator equipment and for storage battery equipment, as well as for head-end systems.

Fire Brick, Magnesite and other Refractories.—General Refractories Co., Philadelphia. Ninety-six page catalog showing in detail the regular products of the 15 plants of this company and indicating some of the special products. The products include fire clay, silics, magnesite and chrome brick, dead burned magnesite, magnesite cement or furnace magnesite, lump or ground chrome ore, chrome cement, ground ganister, silica cement, ground fire clay, and high alumina super-refractories. Illustrations are given of exteriors and interiors of the various plants, together with a large number of dimension drawings of the standardized elements in the product, the latter being in colors. Thirty pages of the catalog are occupied by tables of brick, which will be of much assistance in design work, and a number of the standard engineering tables.

Electrical Instruments.—Roller-Smith Co., 233 Broadway, New York. Several builetins describing circuit breakers, direct current, small portable ammeters, miliammeters, voltmeters, millivoltmeters and voltammeters, also alternating current portable instruments, and precision torsion balances. Some of the products described are new.

Fans.—American Blower Co., Detroit. Circulars describing and illustrating "Ventura" disk fans and "Sirocco" fans.

Underground Conduit.—The Ric-wil Co., Cleveland. Small folders describing and illustrating "Ric-wil" underground conduit for steam and hot water pipes.

Bench Grinder.—Hisey-Wolf Machine Co., Cincinnati. Bulletin No. 1305 gives data on a new Hisey two-wheel, 6-in. electric bench grinder, equipped with a thermostatic safety motor switch and can be supplied with Hisey safety combination wheel guards.

Wire Nails and Wire Products.—Jones & Laughlin Steel Corporation, Pittsburgh. Booklet of 34 pages illustrating various products of its wire plant and of convenient size calculated to prove a handy reference to consumers and distributors for information as to gages, price extrag, etc.

Steel Heating Boilers.—General Boilers Co., Waukegan, Ill. Two brochures, one illustrating Pacific boilers of the smokeless and direct draft tyze, and the other, Pacific boilers for oil firing. A noteworthy point is that the boilers are electrically welded, including staybolts and braces, serving as a notable illustration of the welding of heavy plate work. The boilers are built to meet the specifications of the boiler code of the American Society of Mechanical Engineers.

Chemical Equipment.—Stuart & Peterson Co., Burlington, N. J. Bulletin No. 330, of 16 pages, containing descriptions and illustrations of various types of porcelain lined or plain iron jacketed kettles, caidrons, storage and mixing tanks and vacuum and pressure stills with tabular data covering capacities, sizes, applications and prices.

Automatic Shut-Off Valves.—Johnston Mfg. Co., Minneapolis. Sheet No. 901 describes shut-off valves for fuel oil lines, which close automatically when there is an excessive flow of oil due to a broken pipe or any other cause. The sheet gives specifications of five sizes, from % to 1% in., and from 25 to 800 gal. per hr. capacity.

Ingot Strippers.—The Morgan Engineering Co., Alliance, Ohio. Bulletin No. 30, superseding No. 6, gives illustrations and descriptions of ingot strippers of various types and capacities made by this company. The bulletin contains a list of 67 Morgan strippers in use at various steel plants in this country and abroad.

Forty-Five Papers Before Steel Treaters

(Continued from page 854)

off 15-thousandths per side. A new feature is a washing attachment which is now available as regular equipment and is intended to save handling of the work for the cleaning operation. The attachment consists of a tank which contains the washing solution. After the work is ground it drops into a chute in the washing attachment and is carried by a motor-driven chain conveyor through the cleaning solution, which is agitated by a paddle so that all chips and dirt are washed from the work. coil in the washing tank provides for heating the solution. The work is washed after the first side is ground, as well as after the work is finished. The company's No. 16 high power surface grinder with 26-in. magnetic chuck was also in operation.

The Duomatic lathe of the Lodge & Shipley Machine Tool Co., Cincinnati, which was designed for the advan-tageous use of multiple tooling in turning and facing oper-ations, was a center of interest. A new 12-in. cone-head self-contained motor-driven tool room lathe was also shown. In this machine a reversing motor is mounted on a pivoted plate directly beneath the headstock. A universal relieving

attachment was a new feature also.

Gould & Eberhardt, Inc., Newark, N. J., demonstrated their 32-in. Invincible shaper, which incorporates 12 new features, and also their No. 16 H. S. manufacturing hobbing machine. Improved features of the latter include the slide which has 10 deg. angular adjustment to take care of various pitches of hobs up to the capacity of the machine, which is 3 d.p. A quick hob-shifting device has been added.

A No. 4 plain milling machine and a 2-M tool room miller were exhibited by the Cincinnati Milling Machine Co., Cincinnati. The Cincinnati Planer Co., Cincinnati, demonstrated its 30-in. x 30-in. x 8-ft. planer. cinnati-Acme No. 2 universal flat turret lathe of the Acme Machine Tool Co., Cincinnati, was in operation on 12-in. flanged pulleys, the machining of which involved five oper ations. The No. 12 Teromatic internal grinder of the Giddings & Lewis Machine Tool Co., Fond du Lac, Wis., was under power, the same company showing also its No. 25 horizontal boring, milling and drilling machine. An automatic die sinking machine which duplicates in

the die block the form of a soft master or pattern was exhibited in operation by the Keller Mechanical Engineering Corporation, Brooklyn, N. Y. The 6-in. "Milband" metal cutting band saw, which has been brought out recently by the Henry G. Thompson & Son Co., New Haven,

was shown at work.

One of the larger exhibits in the space of the Lynd-Farquhar Co., Boston, was that of the American Tool Works Co., Cincinnati, which demonstrated five of its machines. These included a 20-in. back-geared crank shaper with motor drive and a 12-in. lathe with 12-speed geared chines. head and self-contained motor drive, the motor being mounted in the leg. A 2-ft. and a 4-ft. radial drill were also shown as well as a 20-in. engine lathe.

A 16-in. quick-change gear lathe, an 18-in, geared-head manufacturing lathe and a 26-in. Whipp open-side crank shaper-planer were exhibited by the Monarch Machine Tool Co., Sidney, Ohio. A No. 3 heavy universal milling ma-chine and a Sunstrand 8-in. stub lathe, tooled for making flange yokes, were shown by the Rockford Milling Machine

Co., Rockford, Ill.

A new metal sawing machine, designated as the No. 66, was shown by the Cochrane-Bly Co., Rochester, N. Y. The capacity of the machine, a description of which will appear in an early issue of Thm Iron Age, is for 10-in. round bars, 9-in. square bars and 8 x 12 in. rectangular A motor-driven universal cutter and tool grinder was exhibited by the Wilmarth & Morman Co., Grand Rapids, Mich., as was also a No. 78 surface grinder, having as a new feature a ball bearing clutch in the gear box, which is intended to assure smooth table action. A centerless cylindrical grinding machine was demonstrated by the Heim Grinder Co., Danbury, Conn.

Three sizes of its nibbling machine, cutting a-in, and %-in. steel plate, were under power in the booth of A. C. Campbell Co., Inc., Bridgeport. One, two and four spindle drilling machines were exhibited by the Chas. G. Allen Co.,

An exhibit of interest was that of the Heald Machine Co., Worcester, which had its new automatic internal grinder under power. Three motors are employed, one each for the headstock, grinding-wheel spindle and oil and water pump. An automatic sizing attachment is a feature. A new Heald automatic rotary surface grinding machine, designated as the No. 25, was exhibited also. This machine is equipped with a down feed mechanism, permitting grinding of work such as ball races. The machine also has a

standard feeding device such as used for piston rings. The ram of the new machine is made in two parts, the lower part consisting of a slide with an inclined plane. The upper part of the ram feeds down on the inclined plane, being actuated by a cam in the rear. be described in a forthcoming issue. The machine will

In addition to its No. 11 plain grinder with constantspeed motor drive, the Brown & Sharpe Mfg. Co., Providence, exhibited its No. 33 automatic manufacturing type milling machine. The company's No. 00 automatic forming machine, equipped with a high-speed spindle, was making brass screws at the rate of 2400 per hr. There was also an attractive display of cutters and small tools.

The Fratt & Whitney Co., Hartford, exhibited a 13 x 20-in. model B lathe, which was equipped with a speed-reducing face plate and taper attachment. Demonstrations were given to show the rigidity of the machine and the positive action of the feed. From a piece of machinery steel a chip action of the feed. From a piece of machinery steel a chip 200 ft. long was cut, the work turning at a speed of 18 r.p.m., the feed being 0.0012 in. per revolution and the width of cut 2 in. The tool was set on an angle. The long chips, which were hung around the booth, attracted attention. There was also a large display of cutters, small roots and gages. tools and gages.

The No. 1A universal hollow hexagon turret lathe re cently brought out by the Warner & Swasey Co., Cleveland, was demonstrated under power. It will be described in an early issue of THE IRON AGE. The New Britain Machine Co., New Britain, Conn., exhibited its No. 454 New-Matic work-rotating type chucking machine which is adapted for the automatic machining of castings, forgings and second operation bar work. It was equipped with self-contained motor drive and with air chucking and unchucking device.

A 4-in. Lo-Swing lathe of the Fitchburg Machine Works, Fitchburg, Mass., was in operation, featuring a new arrangement whereby the turning tools are fed in auto-This is intended to permit matically to the proper depth. multiple cuts to be taken without feeding each tool in-dividually by hand. An automatic back squaring attach-ment with graduated feed was also a feature. This squares, forms and necks for grinding, while the piece is being turned by the front tool. An 8-in. Lo-Swing lathe was in operation on 0.60 per cent carbon hammered spindle forgings, which were 42 in. long, with five different diameters. The new Seneca short cut production lathe, and 9 in. and 13 in. Star The new engine lathes were also shown.

The exhibit of the Jones & Lamson Machine Co., Spring-field, Vt., was large. A 15-in. flat turret lathe for chucking work was in operation, and also two Fay automatic lathes. The new bench type of Hartness comparator, recently developed, was a center of interest. Hartness automatic dies

and Flanders ground taps were also displayed.

The 6-C automatic chucking machine of the Potter & Johnston Machine Co., Pawtucket, R. I., was in operation on spur gear blanks, which were 16 in. in diameter. The blanks were bored, turned and faced in one chucking, the production time being 6 min, each. A 2-M automatic milling machine was also demonstrated.

The Hendey Machine Co., Torrington, Conn., had its 14-in. model E.B.M. lathe under power, also a 24-in. crank shaper and its No. 2-G all geared universal milling machine. Precision lathes and two sizes of internal grinders were demonstrated by the Rivett Lathe & Grinder Corporation, Boston. A 16-in, all-geared head "Low Drive" engine lathe and the Melling cam turning lathe were exhibited by the Walcott Lathe Co., Jackson, Mich.
The National Automatic Tool Co., Richmond, Ind.,

a 13-C cam-feed, %-in. capacity, multiple-spindle drilling and tapping machine in operation. The Barber-Colman Co., Rockford, Ill., had a large exhibit, consisting in part of its No. 12 and No. 3 gear hobbing machines, milling cutters and hobs.

Saws and Other Shop Equipment

Saws and sawing machines were shown by several companies. A new high speed metal cut-off saw designated as the No. 1 has been brought out by the Hunter Saw & Machine Co., Pittsburgh, which exhibited a large variety of inserted tooth saws, hot saws, tube saws and friction disks. The new machine, which will be described in an early issue of THE IRON AGE, is intended to cut cold metal such as the

smaller light section beams, channels, angles, brass, etc. E. C. Atkins & Co., Inc., Indianapolis, demonstrated their No. 3 metal cutting bandsaw machine, and hack sawing machines, in addition to circular, and other metal saw blades. A large variety of saws were displayed by Henry

Disston & Sons, Philadelphia.

Portable hack saw machines, high-speed automatic sav and metal cutting band sawing machines were exhibited by the Armstrong-Blum Mfg. Co., Chicago. Metal sawing machines having a capacity from 4 x 4 in. to 12 x 12 in., were shown by the Racine Tool & Machine Co., Racine, Wis., whose exhibit included also a duplex wood and metal cutting hand saw. The High-Speed Hammer Co., Rochester, N. Y., demonstrated its line of riveting hammers, eight of which were on view. A two-speed direct motor-drive, high speed sensitive bench drill press for holes up to ¼ in. was also in operation. The electric riveting machine of the Kobert Machine Co., Worcester, was demonstrated.

in operation. The electric riveting machine of the Kobert Machine Co., Worcester, was demonstrated.

Machines for washing metal parts were shown. G. S. Blakeslee & Co., Cicero, Ill., had on view their Niagara metal washing machine which is of the paddle wheel type. Rotary nozzles for use in washing machines were a new feature.

The 2-A automatic metal cleaning machine of the Crescent Washing Machine Co., New Rochelle, N. Y., was exhibited in operation. In this machine the washing unit is equipped with two four-way revolving wash arms, which are said to be supplied with 225 gal. per min.

Sandblast machinery was shown by two companies. The operation of sand blast barrels and samples of interesting and intricate work before and after sandblasting were part of the large exhibit of the Pangborn Corporation, Hagerstown, Md. Two universal Slyblast mills were among the machines demonstrated by the W. W. Sly Mfg. Co., Cleveland

demonstrated by the W. W. Sly Mfg. Co., Cleveland.

A motor operated differential lathe chuck which is being placed on the market by E. Horton & Son Co., Windsor Locks, Conn., was demonstrated in connection with a 13-in. Star lathe of the Seneca Falls Mfg. Co. The motor drives through gearing in the chuck, opening and closing the jaws, providing speed and ease of operation combined with wide range.

The Skinner Chuck Co., New Britain, Conn., exhibited a new two-jaw chuck with locked box body, which is designed for use on turret lathes and is said to be especially adapted for production work on odd-shaped pieces. A hole is provided through the center of the body for use of a pilot bushing, or to permit of work passing through the chuck. The jaw is of cylindrical shape, which is said to provide the maximum bearing surface.

Small Tools

A large variety of drills, reamers, cutters, taps, chucks and other tools and accessories were shown by the Morse Twist Drill & Machine Co., New Bedford, Mass., the company's No. 1 plain grinding machine and No. 2 universal grinder being also exhibited.

Cle-Forge high-speed drills of the Cleveland Twist Drill Co., Cleveland, were demonstrated drilling in chrome-nickel steel, machinery steel and cast iron, other drills made by the company being exhibited also.

Parabolic milling cutters, reamers and "7716" drills were shown by the National Twist Drill & Tool Co., Detroit. The Bay State Tap & Die Co., Mansfield, Mass., exhibited high speed and carbon drills, taps and other tools, a new spiral fluted production tap being demonstrated in connection with dial tapping machines of the Anderson Die Machine Co., Bridgeport. Milling cutters, twist drills, taps, dies and other tools were displayed by the Union Twist Drill Co., Athol, Mass.

The Geometric Tool Co., New Haven, had a large exhibit of self-opening and adjustable die-heads, Jarvis tapping devices and other tools, including some that have been recently developed.

A system of boring heads, counterbores, straddle or slotting milling cutters with teeth arranged so that they can be moved out 0.005 in. to compensate for wear, and new inserted tooth sectional hobs were among the features of the exhibit of the O. K. Tool Co., Shelton, Conn.

The Goddard & Goddard Co., Detroit, had an interesting exhibit of standard and special milling cutters. Inserted tooth cutters for channeling side rods, a slitting saw for deep slot work in steel and copper, and a new spiral reamer were

among the new items displayed.

High speed steel ground thread taps, a new ground thread hob, and a new high speed steel thread rolling die were among the tools shown by John Bath & Co., Inc., Worcester. Internal micrometers and internal thread micrometers which measure holes to tenths of thousandths were also on exhibit.

Welding Apparatus and Supplies

Electric welding machines demonstrated by the Thomson Electric Welding Co., Lynn, Mass., included the model 100 spot welder for production work. The maximum capacity is for two pieces of steel or iron 5/32 in. thick. The switch action has been improved to permit quick adjustment for either a selected spring pressure or a rigid pressure. The transformer is of improved split core type. The company's 6 S. P. butt welder, the capacity of which is for iron and steel pieces of 0.0123 to % sq. in. cross-section continuously, or 1 in. sq. at intervals, was in operation. Wheels, rims and straight rods may be welded at the rate of 100 to 300 per hr., depending on size and conditions.

The Federal Machine & Welder Co., Warren, Ohio, exhibited its junior automatic type spot welder for light and medium weight metal. The maximum capacity is two pieces

of A-in. iron or steel, and the machine is said to weld two pieces of A-in. bright steel 120 times per min. The company's No. 70 butt welder having a capacity for 1½-in. rounds was also shown. A new feature is the design of the bearings to prevent dirt, grit or other foreign substance from entering. The upsetting slide is arranged to deflect scale and flash from the bearing ways, which are arranged with tool steel hardened and ground inserts to prevent excessive wear.

A single are portable welding unit, motor generator set with type J control panel, of the Wilson Welder & Metals Co., Inc., New York, was in operation at the booth of the Whitehead Metal Products Co., Boston. The welding range of the unit is from 75 to 200 amp.

The exhibit of the Oxweld Acetylene Co., New York, was a center of interest. Boiler plate was welded, then cut into test pieces, after which it was tested in a 50,000-lb. universal Olsen testing machine, to demonstrate the dependability of the oxyacetylene weld. About 100 tests were made during the week, with the results plotted. Milburn welding and cutting apparatus and supplies were shown at the booth of the New England Compressed Gas Co., Everett, Mass.

The Radiagraph, Camograph and Oxygraph oxyacetylene

The Radiagraph, Camograph and Oxygraph oxyacetylene cutting machines were demonstrated by the Air Reduction Sales Co., New York, which also had a large exhibit of welding apparatus and supplies. The General Welding & Equipment Co., Boston, exhibited in operation an automatic shape cutting machine, the cutting range of which was 12 x 3 ft.

Impressive Display by Steel Companies

More than 35 steel companies exhibited samples of their products and the display was impressive.

The Bethlehem Steel Co., Bethlehem, Pa., displayed the various ingredients that go into its high-speed steel with a high-speed ingot 7½ in. sq. and weighing 400 lb. An automobile engine cylinder block, featured as being improved by the addition of Mayari pig iron, was shown.

The largest exhibit perhaps was that of the Crucible Steel Co. of America, New York, which displayed a wide variety of products manufactured from its steels.

Hardened and ground chrome steel rolls and finish ground tool steel bars were among the items shown by the Midvale Co., Nicetown, Pa.

The American Stainless Steel Co., Pittsburgh, displayed a large assortment of articles made from stainless steel and iron. Of particular interest were large sheets of stainless iron and restaurant and household equipment made of both alloys. Among other material the Driver-Harris Co., Harrison, N. J., showed a Nichrome sheet 128 in. x 57 in. x %-in. thick, which was featured as the largest high nickel-chrome alloy sheet ever rolled.

The United Alloy Steel Co. Canton, Ohio, displayed samples of products made from Uloy electric furnace steel, the products ranging from small balls to carbon vanadium locomotive side rods. Samples of cold-drawn Uloy-Enduro stainless iron were on view, also seamless tubes of that materials

High-speed, alloy and straight carbon steels were exhibited by the Vulcan Crucible Steel Co., Aliquippa, Pa. Of particular interest perhaps were an assortment of punches and dies made from the company's Wolfram high-speed steel. Taps ranging from very large to small watch taps, all of which were of the company's Vulcan special vanadium steel, were displayed. A punch made of the same material and employed in the production of switch levers was said tr have punched 750,000 parts, the tool still being in usable condition. A wide variety of other products was also shown.

An interesting exhibit was that of the International Nickel Co., New York, which showed various forms of hot-rolled and cold-drawn pure nickel. The application of nickel to cast iron was featured in connection with a Cadillac motor block and pistons and in transmission members of trucks and small castings requiring an absence of chill. Automobile radiator shells were exhibited to demonstrate the possibilities of drawing nickel sheets requiring a very bright finish.

Open-hearth carburising steels, forging and other steels were shown by the Pittsburgh Crucible Steel Co., Pittsburgh. A feature of this exhibit was hollow wire used for hypodermic needles, and which was 0.014 in. in diameter and 0.00275 in. in wall thickness.

The Carpenter Steel Co., Reading, Pa., and Donner Steel Co. had booths, and the Central Steel Co., Massilion, Ohio, had a large display of parts made from alloy steels, as well as hot tops from ingots and a display of gears and die blocks.

Another large exhibit was that of the Ledium Steel Co., Watervliet, N. Y., which, in addition to tool and special alloy steels, had an extensive display of tools and parts made from these steels. The Illingworth Steel Co., Philadelphia, exhibited samples of rolled steels, heat-treated and finished dies.

Various tools made from its tool steels, fatigue resisting and a variety of other steels were shown by the Halcomb Steel Co., Syracuse, N. Y., which featured also its Halcotralloy brand for automobile parts.

The Atlas Crucible Steel Corporation, Dunkirk, N. Y.; the Colonial Steel Co., Pittsburgh; the Firth-Stirling Steel Co., McKeesport, Pa.; William Jessop & Sons, Inc., Boston; the Tacony Steel Co., Philadelphia; the Vanadium Alloys Steel Co., Latrobe, Pa., and the Vanadium Corporation of America, New York, were among other exhibitors.

New York, were among other exhibitors.

Edgar T. Wards' Sons Co., Boston, had a large exhibit, as did also Wheelock, Lovejoy & Co., Inc., Cambridge, Mass.,

and Wetherell Brothers Co., Cambridge, Mass.

An interesting display was that of the Gathmann Engineering Co., Baltimore, Md., which exhibited steel ingots split open for inspection, and also models of its big end up molds, and cross-section flats of differential corner ingots for surface improvement. The company's patented refractory ingot mold tops were also on view.

The General Alloys Co., Boston, exhibited a variety of castings made from its Q-alloy, and the welding of the Q-alloy was demonstrated. Calorized steel annealing boxes and other products were exhibited by the Calorizing Co., Pittsburgh.

Symposium on Metallurgical Education

On Friday afternoon was held an educational symposium under the chairmanship of Dr. Oscar E. Harder. The papers included "Metallurgical Education," by Bradley Stoughton, Lehigh University; "On Metallurgical Education," by Dr. Samuel L. Hoyt, General Electric Co.; paper by Prof. D. J. Demorest, Ohio State University. Dr. Hoyt said in part:

The impression gained of metallurgical education in this country is that it is largely practical in nature. The aims and scope of the work for the undergraduate years are designed to give the student familiarity with the tools of the profession, whether these tools be the

iron-carbon equilibrium diagram or a commercial heat treating furnace, or the principles of quantitative analysis. While no general statement is rigorously correct, I believe it may be safely said that our technical educations trains the hands rather than the mind. This statement certainly fits the case far better than the converse.

Let us say, then, that we have arrived at the fact of the matter. The next step is:—what of it, is it right or wrong? A young man recently asked for advice as to the proper training for four years devoted to a college education in the metallurgical profession. The advice was that he should major in physics and select as the most important secondary subjects, metallography, chemistry (including physical-chemistry), and mathematics, and that he work in a practical way during the summer vacation period. The courses in physics, particularly, give him an understanding of the natural laws underlying physical and chemical phenomena and mechanical behavior, which are of importance in metallurgical practice. His aim will be to determine why the thing works as it does, rather than to learn, first, that it works at all, and second, how it works.

It is believed that it would be far better to teach the student the general principles underlying all metallography and then to take up the application of these principles to special alloy systems and to technical practice. In this scheme one proceeds from the general to the special. If this method is correct for the teaching of metallography, then it is correct for the teaching of metallurgy in general.

Trade Changes

The Gas Producer & Engineering Corporation has moved its offices to the Packard Building, Fifteenth and Chestnut Streets, Philadelphia.

The Wheeling Steel Corporation has closed its Cleveland district sales office and hereafter will handle the business of that district direct from the general sales offices in Wheeling, through salesmen traveling from Wheeling.

Fred A. Karste has retired as factory manager of the Falls Motors Corporation, Sheboygan Falls, Wis., which is in receivership, and established the Eastern Wisconsin Motor Co., at Sheboygan, Wis., to deal in automobiles, trucks, tractors, etc. Harvey J. Irvin and Theodore C. Widder, also former department heads of the Falls company, are associated with Mr. Karste in the new enterprise.

The Roller-Smith Co., 233 Broadway, New York, maker of electrical instruments and circuit breakers, announces the appointment of the Thrall Electric Co., Presidente Zayas No. 27 and Esquina A Habana, Havana, Cuba, as exclusive representative for Cuba. The Thrall company is successor of the Charles H. Thrall Electric Contracting Co., which succeeded Charles H. Thrall & Co. The Thrall Electric Co. is a sales and engineering organization carrying stocks of electrical machinery, instruments and supplies.

The Hanna Engineering Works, 1765 Elston Avenue, Chicago, manufacturer and distributor of Hanna riveting machines, air hoists, sand sifters and I-beam trolleys, is represented in Minesota, North Dakota, South Dakota, Iowa, and eastern Nebraska by the George M. Kenyon Co., Room 303, Zenith Building, 116 East Fourth Street, St. Paul, Minn.

Arthur H. Jones, L. C. Smith Building, Seattle, Wash., has been appointed district sales representative of the Worth Steel Co., Claymont, Pa., for plates sales in the States of Washington and Oregon, also in British Columbia. Mr. Jones has been Seattle representative of the Trumbull Steel Co., Warren, Ohio, in the sale of sheets and tin plate for many years, and will retain this connection.

The Logan Coal Co., Philadelphia, has changed its address to Rooms 1018-22 Packard Building, Fifteenth and Chestnut Streets.

The Pipe, Nipple & Specialty Co., manufacturer of brass and iron nipples and pipe, has moved to 537 Coster Street, Bronx, New York.

The Economy Fuse & Mfg. Co. Chicage, has moved its Minneapolis district sales office to 1008 Marquette Avenue.

The offices of America at Work have been moved from \$29-30 Odd Fellows Building to Rooms 418-21 Title Guaranty Building, 706 Chestnut Street, St. Louis.

The Wm. J. Sweet Foundry Co. will move about Oct. 15, to Chestnut Avenue, Hillside, Newark, N. J., where it has erected a foundry building to provide further facilities in the production of castings of Inco monei metal and pure nickel.

Industrial News Notes

The Kokomo Steel & Wire Co., Kokomo, Ind., at a recent meeting of its directors, took preliminary steps towards the ratification of an agreement to merge that company with the Crawfordsville Wire & Nail Co., Crawfordsville, Ind. It is intimated that a third company likely to be included in the merger is the Cyclone Fence Co., Waukegan, Iil. Some time ago negotiations were under way looking to a merger of the Kokomo and Crawfordsville companies with the Keystone Steel & Wire Co., Peoria, Ill., but it is said that the last-named organization has been eliminated from consideration and that the Waukegan company is being considered instead.

The W. W. Sly Mfg. Co., Cleveland, reports the following among its recent orders. A set of sand blast rooms for cleaning small ware and a set for cleaning tubs, laboratories, etc., a total of eight for the Crane Enamelware Co., Chattanooga, Tenn.; six sand blast rooms for cleaning railroad castings for the Buckeye Steel Castings Co., Columbus, Ohio, and tilting sand blast mills from the Falcon Bronze Co., Youngstown, Ohio, and the Ross-Meehan Foundries, Chattanooga, Tenn.; tumbling mill equipment for the Southside Malleable Castings Co., Milwaukee, Wis., and the American Radiator Co., Buffalo; dust arrester equipment for the Packard Motor Car Co., Detroit, F. E. Schundler foundry, Jersey City, N. J., Falcon Bronze Co., Youngstown, Ohio, Crane Co., Bridgeport, Conn., Buckeye Steel Castings Co., Columbus, Ohio and the Vanadlum Corporation, Bridgeville, Pa.

The Borg & Beck Co., Chicago, manufacturer of clutches for automobiles, has acquired all capital stock of A. O. Norton, Inc., with a plant at Boston, and A. O. Norton. Ltd., with a plant at Coaticook, Can., manufacturer of ball bearing and other kinds of jacks for railroads, bridges and construction work. Both the Norton plants have been taken over by the Borg & Beck management and all directors of the Chicago company were elected to the board of the Norton companies. Harry Norton has been retained as president and director in the two companies acquired.

The Consolidated Products Co., 15 Park Row, New York, dealer in used equipment, has purchased the plant of the American Hominy Co. at Indianapolis, with all equipment, which includes a complete power plant and milling plant.

The plant of the Wallingford Mfg. Co. has been sold to the American Fork & Hoe Co., Swetland Building, Cleveland, which will use it as the main eastern plant. Improvements and extensions are being planned. John H. Graham & Co., New York, will continue as selling agent for products of the Wallingford company.

The Prairie Oil & Gas Co., Craig, Colo., is completing plans for the installation of a pipe line, with pumping stations, etc., from Craig to the oil refinery of the Producers & Refiners Corporation, Parco, Wyo., about 115 miles.

Machinery Markets and News of the Works

36 4 (2001 817)

BUSINESS REMAINS QUIET

Some Encouraging Signs, but Real Pick-Up Has Not Developed

A. O. Smith Corporation, Milwaukee, Places Order for 41 Special Manufacturing Lathes

Machine-tool business throughout the country is still of small volume, and although some of the indications are slightly more encouraging, there has been as yet no real trend toward improvement.

In a dull market the order of the A. O. Smith Corporation, Milwaukee, for 41 special manufacturing

lathes stands out as exceptional. Otherwise scattered sales of single machines continue to be the rule.

To the extent that many users of tools are taking more interest than they did a month ago the outlook is better. Quite a number of fair-sized lots of tools are being figured on, but in most instances the purchase of these tools is dependent upon a general resumption of business activity.

Cincinnati reports some inquiries from abroad, railroads of South and Central American countries have sent out a number of fair-sized inquiries.

Further purchasing by American railroads is expected, but orders in the past week have been mostly for single machines. The Chesapeake & Ohio is expected to close shortly on its list.

New York

NEW YORK, Sept. 30.

THE machine-tool market continues quiet, with few new inquiries appearing. The Eric Railroad has closed on a 48-in. car-wheel borer; the Delaware, Lackawanna & Western on two 48-in. car-wheel borers and two combination general turning and axle lathes; the Youngstown Sheet & Tube Co. on an 800-lb. single frame steam hammer; the Parkersburg Machine Co. on an 1100 lb. single frame steam hammer.

Tentative plans are under consideration by the R. Wicks Co., 556-58 West Fifty-second Street, New York, manufacturer of cabinets, etc., for rebuilding the portion of its plant destroyed by fire Sept. 20 with loss reported at \$200,000 including equipment.

The secretary, Ministry of Public Works, Buenos Aires, Argentina, is asking bids until Oct. 27 for 25 steam traveling cranes and one stationary electric crane.

The Central Metal Ceiling Co., 771 Gates Avenue, Brooklyn, will erect a one-story addition, 25 x 100 ft. Tobias Goldstone, 50 Graham Avenue, is architect.

The Western Electric Co., 195 Broadway, New York, has plans for an eleven- story addition to its works on the block bounded by West Washington, Bethune and Bank Streets, 81 x 128 ft., to cost \$750,000. McKenzie, Voorhees & Gmelin, 342 Madison Avenue, are architects,

Nathan Rotholz, 311 Lenox Avenue, New York, architect, has completed plans for a six-story automobile service, repair and garage building, 75 x 100 ft., at 207-11 West Seventy-sixth Street, estimated to cost \$220,000 with equipment.

The Electrical Equipment Division, Bureau of Foreign and Domestic Commerce, Washington, has received information from Henry S. Waterman, San Jose, Costa Rica, United States Consul, regarding a new hydroelectric company, organized with a capital of \$175,000, to construct a hydroelectric generating plant on the Torres, Tirivi and Virilia Rivers for commercial service at San Jose and vicinity.

R. Liddelow, secretary, State Electricity Commission, Melbourne, Victoria, Australia, will receive bids until Dec. 1 for 66,000-volt transformers, induction regulators and accessories for the Yallourn Power Scheme, specification No. 24/88, on file at the offices of the Bureau of Foreign and Domestic Commerce, 734 Customs House, New York, and 76 West Monroe Street, Chicago.

A power house will be built at the four-story laundry plant, 60 x 200 ft., to be erected at 134th Street and Southern Boulevard, New York, estimated to cost \$250,000

with machinery. Thomas E. Murray, Inc., 55 Duane Street, is architect in charge.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until Oct. 7 for 760 ft. galvanized steel flexible metallic hose for the South Brooklyn Navy Yard, and for 2330 ft. flexible copper steam hose; also for 1090 ft. of first noted and 3330 ft. last noted for the Hampton Roads yard; and 120 ft., first noted, for the Mare Island yard, schedule 2695.

The Department of Plant and Structures, Municipal Building, New York, has awarded general contracts to the T. A. Reilly Co., 48 East Forty-first Street, for its proposed housing and repair buildings for municipal equipment on Delahosy Street, New York, and Kent Avenue, Brooklyn, to cost \$105,000 and \$88,400 respectively.

The Standard Oil Co. of New Jersey, 26 Broadway, New York, has filed plane for a three-story oil storage and distributing plant at 90-100 Hoboken Avenue, Jersey City, N. J., to cost \$125,000. It will also erect a one-story automobile service, repair and garage building at the same location to cost \$45,000.

The Board of Education, Roselle, N. J., plans the installation of manual training equipment in the three-story addition to be erested at the high school, estimated to cost \$300,000, for which bids will be asked on a general contract in about 30 days. Rasmussen & Wayland, 36 West Forty-seventh Street, New York, are architects.

The New Jersey Power & Light Co., Dover, N. J., will issue bonds for \$694,000, preferred stock for \$183,500, and notes for \$76,500, the proceeds to be used for extensions and betterments in power plants and system, and the purchase of additional power properties.

The Forstner Chain Corporation, 646 Nye Avenue, Irvington, N. J., manufacturer of jewelry chains, etc., has plans for a new three-story factory, 65 x 110 ft., on Burnett Avenue, Maplewood, N. J., to cost \$80,000 with equipment. Edward C. Epple, 9 Clinton Street, Newark, is architect

The Thatcher Furnace Co., 2-20 St. Francis Street, Newark, N. J., will build a one-story shop addition to cost \$20,000. A one-story foundry addition will also be erected.

C. P. Sandberg, 100 Broadway, New York, will receive inquiries for rolling stock accessories, consisting of 1000 car axleboxes, complete; 1100 elliptic car springs with shoes, and 1000 sets of axlebox guides.

The Electro-Mechanical Engineering Ca., 269 Whiten Street, Jersey City, N. J., recently organized to operate a general machine works and repair shop, will be in the market for motors, generators, steel sheets, angle iron, pulleys shid such equipment as will be required for contracting work; also electrical supplies, shafting, hardware, commutator bars, copper bars and steel cable. Immediate operations will be on a small scale. John Church heads the company.

Buffalo

BUFFALO, Sept. 29.

PLANS have been drawn by the New York Central Rail-Proad Co., Buffalo, for a two-story shop, 65 x 90 ft., at its repair works, 74 Stanley Street, to cost \$35,000.

The Niagara, Lockport & Ontario Power Co., Buffalo, has completed arrangements with the Pennsylvania Electric nas completed arrangements with the Pennsylvania Electric Corporation, operating the Penn Public Service Co., Johnstown, Pa., for interchange of power, and will extend its 110,000-volt transmission line to the New York-Pennsylvania State line, between Jamestown, N. Y., and Warren, Pa. The work will include automatic substation equipment, high tension line apparatus and expansion in generating facilities. Similar expansion will be carried out by the Penn Public Service Co. erating facilities. Similar expa-by the Penn Public Service Co.

The Jamestown Metal Desk Co., Jamestown, N. Y., is said to be planning for the purchase of lathes and other machine tools, welding apparatus, etc.

Lewis & Hill, 892 Main Street, Buffalo, architects, have plans for the construction of a one-story automobile ser vicc, repair and garage building at Lockport, N. Y., 100 x 160 ft., estimated to cost \$38,000.

The plant of the Lawler Iron Works, at the foot of Gull and Ferry Streets, Buffalo, was burned last week, the loss estimated at \$25,000.

A contract has been awarded to George K. Ahlquist, 162 Sturgis Street, Jamestown, N. Y., by Swanson's Machine Shop, 409 Washington Street, for a one-story brick and tile machine and repair shop at 2229 Washington Street, to cost \$25,000, including equipment, which will all be electrically operated. Leonard F. Swanson heads the company.

Electrical pumping machinery and equipment will be required in connection with the erection of a 4,000,000-gal. reservoir at Newton Run, by the Water and Light Com-mission, Salamanca, N. Y., for which a general contract has been awarded to Mullen, Guinnane & Ludwig, 303 North Main Street, Jamestown, N. Y.

Philadelphia

PHILADELPHIA, Sept. 29.

BIDS are being asked by the quartermaster, intermediate depot, United States Army, Twenty-first and Oregon Streets, Philadelphia, until Oct. 30, for an auxiliary boiler plant, including one boiler with fuel-oil burning equipment, oil tanks, etc., with accessory apparatus, circular 56.

The Ford Motor Co., Detroit, will hold in abeyance the construction of its proposed assembling plant on a 70-acre tract between Sixty-third Street, Elmwood Avenue and the Schuylkill River, Philadelphia, estimated to cost \$750,-000, for which plans were prepared by Albert Kahn, Marquette Building, Detroit. New bids will be asked when the project is ready to go ahead.

The United States Pencil Co., Sixtieth and Baltimore Streets, Philadelphia, is taking bids on a general contract for a two-story and basement addition, 60 x 220 ft., estimated to cost \$75,000.

The Gulf Refining Co., Widener Building, Philadelphia, has awarded a general contract to the Austin Co. for a two-story machine shop, estimated to cost \$70,000.

The Foreign Trade Bureau, Philadelphia Commercial Museum, has received the following inquiries: 42641, from Dott. Allessandro Baggio & Compagnia, Corso Valentino 9, Turin, Italy, desiring to get in contact with manufacturers of chrome nickel wire; 42650, from N. V. Technisch Advies & Handelsbureau "Draayer," Djember, Java, Dutch East Indies, desiring to get in touch with American manufacturers of ribbed cast iron conduits in 2-meter lengths, flanges both ends, to 2 to 3½ in. inside diameter; 42661, from Ramon Balana, San Roque 108, Barranquilla, Colombia, desiring to get in touch with manufacturers of tin tubes also, manufacturers of cardboard boxes and cases; 42643, from Javier Maxemin, Apartado 55, Guaymas, Mexico, in the market for machinery for the manufacture of ice cream cones; 42658, from W. Schendel, P. O. Box 424, Porto Alegre, Brazil, wishing to get in touch with manufacturers of barbed wire and tinplate; 42659, from A. M. Yateem Brothers, Bahrein, Persian Gulf (via Bombay), desiring to get in contact with manufacturers of ice-making and refriger-ating machinery, tobacco machinery, electric batteries, car trucks, cutlery, gas and gasoline engines, iron and steel, locks, sugar machinery, textile machinery, pulleys, machinists' tools and electrical apparatus, and 42644, from George Cassis & Compania, Tela, Honduras, desiring to get in touch with manufacturers or exporters of locks and tools.

Officials of the Pennsylvania Power & Light Corporation, Allentown, Pa., are organizing two new subsidiaries, to be known as the Middle Smithfield-Monroe Power & Light Co., and the Hamilton-Monroe Power & Light Co., to operate plants and systems in Middle Smithfield and Hamilton Townships, respectively.

The Common Council, Rockwood, Pa., is completing arrangements for the purchase of the power plant of the Rockwood Electric Co., to be operated in the future as municipal property. Extensions and betterments are under advisement, including additional equipment.

Fire, Sept. 22, destroyed a portion of the two-story pulp mill of the New York & Pennsylvania Co., Lock Haven, Pa., including mixing and digester machinery, with loss reported at \$200,000. Plans for rebuilding are under consideration. Headquarters of the company are at 200 Fifth Avenue, New York.

Fire, Sept. 20, destroyed the coal tipple at the plant of the Eclipse Coal & Gas Co., Finleyville, Pa., with loss estimated at \$50,000 including equipment. It is planned to rebuild.

The Reading Paper Mills, Inc., Reading, Pa., for a four-story addition to its local Packerack Mills, estimated to cost \$150,000. The other local mill will be removed the new building and additional equipment installed. The Glenside Mill of the company, devoted to coarse wrapping papers, will be continued in service. William G. Coxe is president.

Contract has been awarded to the H. K. Ferguson Co., Cleveland, by the Penn Hardware Co., Reading, Pa., for a one-story, brick, steel and concrete addition, 100 x 300 ft., to cost \$61,800.

A lathe, drill press, reboring machine and other repair shop equipment will be installed by the Central Motor Co., Waterford, Pa., in a two-story concrete garage and service station, 40 x 80 ft., now under construction.

Chicago

CHICAGO, Sept. 29.

THE transaction of chief interest the past week was the purchase of 41 special manufacturing lathes by the A. O. Smith Corporation, Milwaukee. These will be built according to the Smith company's own design and will be used for threading oil pipe couplings. The placing of considerable additional tools for the Chicago public schools has been delayed through the reference of proposals to another committee of the Board of Education. Scattered purchases of individual machines continue to be the rule and inquiries, while not numerous, are believed to be on the increase.

Greater activity in the shops of Chicago district railroad car builders is regarded as a good augury and the materially improved condition of the farmer is expected to make itself felt in practically all lines of industry as winter approaches. The Universal Portland Cement Co. is inquiring for two 22-in. engine lathes for its Buffington, Ind., plant.

Hoeft & Co., manufacturers of poultry supplies, now at 400 North Ashland Avenue, Chicago, have purchased from the Standard Conveyor Co., St. Paul, Minn., a one-story factory at Davis Street and Morrow Avenue, North Chicago, containing 40,000 sq. ft. of floor space.

The A. B. C. Pattern & Foundry Co., now at 724 Curtis Street, Chicago, has purchased a plant at 2021-37 West Kinzie Street, which it will occupy after additions and altera-

The National Lead Battery Co., St. Paul, Minn., will establish a branch plant in the Chicago district, having purchased for that purpose the factory of the Red Top Steel Post Co., at Chicago Heights, Ill., consisting of a one-story building containing 20,000 sq. ft. of floor space and 2½ acres of ground with switch tracks from the Chicago Heights Transfer Railway.

Holton Seelye & Co., builders, 140 South Dearborn Street, Chicago, have awarded the masonry for a two-story garage and machine shop with restaurant and locker rooms, 159 x 170 ft., at 640-54 Fullerton Avenue, to cost \$150,000. ing will be occupied by the Yellow Cab Co., Chicago.

Armour & Co., Union Stock Yards, Chicago, will build a two-story boiler house, 53 x 114 ft., in connection with their

soap factory at 3200 Benson Street, to cost \$13,000.

The International Harvester Co., 606 South Michigan Avenue, Chicago, will erect a three-story plant at 1015 West 120th Street, to cost \$8,000.

The Arrowhead Iron Works, 426 West Fifth Street, Kansas City, Mo., has purchased a two-story plant at 421-31 West Fifth Street, as a new location for its business.

The Crane Market

THERE has been considerable activity the past week in the award of pending business, but new inquiries seem to be almost entirely confined to requests for prices on small capacity equipment, used being specified in some cases. Bethlehem Steel Co. has closed on the 17 overhead cranes for the Johnstown plant and the Southern Railway has bought nine of the ten cranes for which it has been in the market from the Pawling & Harnischfeger Co. The market on locomotive cranes continues quiet with but few awards reported. Inquiries from contractors are still active and some business in this line is expected to be placed before

In the Pittsburgh district the Jones & Laughlin Steel Corporation has plans for improvements at its Pittsburgh works that call for several cranes and there are still a good many cranes to be bought for Pittsburgh district plants of the Carnegie Steel Co., notably at Homestead. It is understood that practically all the cranes for the Lackawanna plant of the Bethlehem Steel Co. went to one maker.

Among recent purchases are:

Southern Railway, Washington, two 200-ton, 77-ft. 3½-in. span, 6-motor, double trolley, cranes; one 1-ton, 61-ft. 8-in. span, 3-motor crane; one 15-ton, 60-ft. span, 3-motor and two 15-ton, 75-ft. 3-in. span, 3-motor cranes, for the shops at Atlanta, Ga. and one 15-ton, 23-ft. 11-in. span, 3-motor crane; one 20-ton, 38-ft. span, 3-motor and one 15-ton, 60-ft. span, 3-motor crane for the shops at

Spartanburg, S. C., all from the Pawling & Harnischfeger Co. Hattlesburg Creosoting Co., Hattlesburg, Miss., four 12-ton locomotive cranes from the American Hoist & Derrick Co.

U. S. Fibre Co., Baltimore, Md., a 15-ton, 40-ft. boom, ad Brownhoist locomotive crane from Philip T. King, New York.

J. D. Walsh, Inc., Brooklyn, N. Y., a 7-ton, gasoline driven crane from the Byers Machine Co.

Public Service Production Co., Newark, N. J., a 6-ton hand power crane from an unnamed seller.

Nichols Copper Co., Brooklyn, N. Y., a 3-ton electric hoist from the Shepard Electric Crane & Hoist Co.

Bethlehem Steel Co., for its Johnstown, Pa. plant, double-hook cranes of various spans and capacities from the Morgan Engineering Co., one 50-ton power house crane from the Alliance Machine Co. and two 10-ton, 56-ft, and 61-ft. span overhead cranes from the Bedford Foundry & Machine Co.; for the Lackawanna works three 75-ton mill type cranes from the Alliance Machine Co.

Hubbard & Co., Pittsburgh, for new plant at Emeryville, Cal., one 5-ton electric traveling crane from the Northern Engineering Works.

Inland Steel Co., Chicago, a 10-ton electric traveling crane for Indiana Harbor, Ind., from the Pawling & Harnischfeger

The Rindsberger Mfg. Co., 18 East Twenty-fourth Street, Chicago, manufacturer of lamps, etc., is taking bids on a general contract until Oct. 15 for the erection of a five-story and basement plant, 120 x 140 ft., on Wabash Avenue, to cost \$200,000 with equipment. Sidney Minchin, Inc., 53 West Jackson Boulevard, is architect.

The Western Tie & Timber Co., Syndicate Trust Building, St. Louis, has preliminary plans for the construction of a new mill on a 300-acre tract near Edwardsville, Ill., with power house, estimated to cost \$100,000.

The Library Bureau, 1250 Homan Avenue, Chicago, manufacturer of filing cabinets and other office equipment, has awarded a general contract to the H. K. Ferguson Co., Cleveland, for a one-story addition, 80 x 145 ft., to cost \$25,000 exclusive of equipment. Mundie & Jensen, 39 South La Salle Street, are architects.

The Northern States Power Co., Minneapolis, Minn., will remodel the power plant at Tracy, Minn., recently acquired from the Citizens' Light & Power Co., and install additional

The G. & W. Refrigerator Co., Cloquet, Minn., is completing plans for the erection of the first unit of its factory for the manufacture of refrigerators and refrigerating equip-ment estimated to cost \$27,000. F. W. Geissler is president.

The Domestic and Foreign Commerce Department, Chicago Association of Commerce, 10 South La Salle Street, has eceived an inquiry (4061) from a company at Mexico City, Mex., operating a brass foundry, in the market for molding and forming machines; also an inquiry (4059) from a company at Camden, N. J., in the market for wrought iron scrap, not less than 6 in. in diameter and 8 to 10 ft. long, as line shafting, marine forgings, etc.

The Ajax Fence Co., Fort Madison, Iowa, manufacturer of wire fencing, is reported in the market for cutting, bending and finishing machinery and other equipment, for installation in an addition, 60 x 120 ft., now under construction.

The Utica Hydraulic Cement Co., Utica, Ill., is in the market for machine and repair shop equipment, transmission, conveying and hoisting machinery, etc., to replace that destroyed by fire recently.

Cleveland

CLEVELAND, Sept. 29.

MACHINERY sales for September show some gain over August. There seems to be a slight improvement from week to week, but with few orders for more than single machines. The outlook is considerably better than a month ago as users are taking more interest in prospective requirements and several fair sized lots of machinery are being figured on without the issuance of formal lists. Sales in the automotive field continue very light, but some business is in prospect in the Detroit territory.

A Cleveland lathe manufacturer during the week took an order for two large turret lathes from the Tennessee Coal, Iron & Railroad Co. and for six small machines from a New York brass goods manufacturer. It is expected that the White Motor Co. will place about 10 machines within the next few days for its new experimental shop. These include lathes, milling machines and other tools, for which an inquiry was issued some time ago.

The Howard Stove Co., Beaver Falls, Pa., has placed a contract with the Austin Co., Cleveland, for the construction of a steel frame manufacturing building, 50 x 100 ft.

The American Stove Co., Cleveland, has placed a contract for an addition to the plant of its Reliable division, Cleveland.

The Dawson Iron & Wire Co., 4303 Payne Avenue, land, has taken bids for a one-story factory, 60 x 80 ft.

The Ohio Electric Power Co., Sidney, Ohio, contemplates either the erection of a new power house or the purchase of a power plant and the installation of new equipment. Robert E. Marshall is president.

A manual training department will be established in connection with a \$350,000 high school to be erected in Ashland, Ohio, plans for which are now being prepared. John Grindell is clerk of the Board of Education.

The Novelty Lamp & Shade Co., 2490 East Twenty-second Street, four-story addition and boiler room, estimated to cost

The Toledo Steel Casting Co., Toledo, Ohio, is planning the erection of an addition. Mills-Rhines-Bellman & Nordhoff, Ohio Building, Toledo, are the architects.

C. H. Hulme, 1924 East 105th Street, Cleveland, is in the market for a No. 16 Blanchard grinder, 10 x 24 in. Landis planer, two Kempsmith plain milling machines, electric riveter and an abrasive surface grinder.

New England

BOSTON, Sept. 29.

THIS week closes what is generally termed among local machine-tool houses as the most disappointing month of 1924. With inquiries negligible and with old prospects evincing little interest in equipment, the trade the past week devoted most of its attention to the steel treaters' convention held here. The largest recent sales include two 36-in. Bradford lathes to the Boston & Albany Railroad, and two used turret lathes, similar to Warner & Swasey machines, to a local

An improved demand is shown for small tools and ma-chinery parts. Carbon bit stock drills remain unchanged at

60 per cent discount, but all other carbon drills are now 50 and 10 per cent discount, contrasted with 60 and 10 and 65 and 10 per cent heretofore. Large sizes of high speed drills have been advanced about 10 per cent, while smaller sizes have been reduced moderately.

The machinery equipment and property of the Carter & Hakes Machine Co., Winsted, Conn., was sold at public auction Thursday, Sept. 25.

Plans are being prepared for a two-story, 88 x 192 ft., factory and office for the Thermos Electric Co., New Haven, Conn. Dwight E. Smith, 152 Temple Street, New Haven, is the architect. A 10-ton electric crane will be required.

Contract has been awarded for the erection at Medford, Mass., of a two-story and basement junior high school to contain manual training departments. F. White is secretary of the school house commission. M. A. Dyer, 1 Beacon Street, Boston, is the architect.

Work has been started on a coal handling plant at Derby and Union Streets, Salem, Mass., for the George W. Pickering Coal Co., to be equipped with conveying machinery, runways, etc. George P. Carver, Inc., 261 Franklin Street, Boston, is the engineer.

Plans will be ready about Oct. 15 for a coal pulverizing plant for the Narragansett Electric Light Co., Providence, R. I. Jenks & Ballou, 10 Weybosset Street, Providence, are the engineers.

The Pittsfield Lime & Stone Co., Pittsfield, Mass., is completing plans for additions in its works in the Richmond Summit section, to include the installation of a stone crusher, four kilns and accessory equipment, hydrating machinery and other apparatus, estimated to cost \$200,000.

The New Hampshire Power Co., Sunapee, N. H., is reported to be planning the construction of an addition to its electric generating plant to cost \$200,000 with equipment.

Silverman, Brown & Heenan, 51 Cornhill Street, Boston, architects, have plans under way for a two-story automobile service, repair and garage building at 5-15 Madison Court, estimated to cost \$150,000.

The Moosehead Paper Co., Skowhegan, Me., has preliminary plans for extensions and the installation of new beater machinery and accessory equipment to double approximately the present capacity. It is purposed to install another paper-making machine later. The company was incorporated recently with capital of \$300,000 to take over the former local mill of the Savage Paper Co. David A. Chapman is president; Carl Symonds is superintendent.

R. P. Jackson, 86 Main Street, Brockton, Mass., architect, has plans for a two-story automobile service, repair and garage building, 105 x 140 ft., estimated to cost \$55,000.

The Morgan Construction Co., Worcester, Mass., manufacturer of wire-drawing and rolling mill equipment, is having plans drawn for a one-story addition, 150 x 250 ft., estimated to cost \$100,000 with machinery. It is proposed to install several electric traveling cranes.

The Boston & Maine Railroad Co., North Station, Boston, is said to be planning the erection of new shops at Springfield, Mass., estimated to cost \$65,000.

Cincinnati

CINCINNATI, Sept. 29.

THE machinery market is showing more activity and probably the most encouraging feature is the receipt of inquiries from European, South American and Central American countries. A local manufacturer received an inquiry for a number of special production machines from a European buyer, and also an order, for trial purposes, of a high production machine for automobile work. Accompanying the order was the intimation that if the machine is satisfactory a contract for several will follow. Railroads of South American and Central American countries have sent out fair-sized inquiries and orders are looked for shortly.

The Chesapeake & Ohio Railroad is expected to take action on its list in the next week or two and the Big Four is also expected to buy shortly. The Louisville & Nashville has issued a small list, presumably for its Corbin, Ky., shops, and has asked for figures on a large list for a contemplated shop near New Orleans. An inquiry for six grinding machines from an automotive manufacturing is being figured on.

General industrial buying has been light, but with the increased interest taken in machine tools,

as shown by the number of inquiries being received, larger buying is expected this fail. Unquestionably the uncertainty regarding the outcome of the presidential election has been a deterrent to buying, but this is being discounted to some extent and more confidence is shown in the future.

The Chase Foundry & Mfg. Co., Columbus, Ohio, manufacturer of conveying machinery, will award contract for an addition, 80 x 100 ft., two stories, to take care of increasing business and also to provide for future expansion.

The Case Crane & Engineering Co., Columbus, is completing an addition to its Case Crane division plant. It contemplates rearranging its works, the Case Crane division and the Kilbourne & Jacobs division, to more efficiently manufacture its products. The company has been fairly busy manufacturing cranes, dump cars and wheelbarrows.

The Columbus Railway, Light & Power Co., Columbus, has started preliminary work on a large power generating plant near Columbus. Building of the power plant will not commence, however, before next spring, all bids having been rejected. The plant when completed, including equipment, will cost approximately \$3,000,000.

The Boyertown Burial Casket Co., Boyertown, Pa., which recently purchased the plant of the Ohio Casket Co., Columbus, has purchased the plant formerly occupied by the Coats Steam Car Co. Considerable alterations will be necessary. The Boyertown company operates plants in several Eastern cities and proposes to make Columbus its Western head-quarters.

The Columbus Silvering & Beveling Co., Columbus, has purchased property on East Goodale Street, and contemplates the erection of a factory, plans for which are now being prepared.

The Louis E. Emerman Co., Chicago, which recently purchased part of the Barney & Smith Car Co.'s plant at Dayton, Ohio, is contemplating the establishment of a car repair plant, but a definite decision has not been reached.

The Modern Foundry Co., Oakley, Cincinnati, has awarded a general contract to the Fisher-Devore Co., Cincinnati, for extensions and improvements. Additional equipment will be installed.

Refrigerating and ice machinery will be installed in the two and three-story packing plant to be erected by L. P. Bornwasser & Co., 921 Geiger Street, Louisville, estimated to cost \$160,000 with equipment. Henschien & McLaren, 1637 Prairie Avenue, Chicago, are architects.

The R. Mansfield Co., 621 East Market Street, Louisville, manufacturer of store fixtures, display cases, etc., has preliminary plans for a new factory, estimated to cost \$150.000 including equipment. Carl T. Wedekind is president.

Manual training equipment will be installed in the twostory and basement high school to be erected at Willard, Ohio, estimated to cost \$180,000, for which bids will soon be asked on a general contract. Granville Scott, Citizens' National Bank Building, Norwalk, Ohio, is architect.

E. W. Cooper, 174 Third Avenue, North, Nashville, Tenn., engineer, has inquiries out for an electric traveling crane, about 20 tons capacity, 40 to 50 ft. span.

The Davidson County Board of Education, Nashville, Tenn., has awarded general contract to Daniel & Duke, Nashville, for a one-story manual training department at the central high school, to cost about \$50,000. A portion of the structure will be used for a gymnasium. C. A. Ferguson, 63 Arcade, is architect.

The Mills Equipment Co., Chattanooga, Tenn., has inquiries out for a traveling crane, with 35 to 40-ft, boom, ½ to ¾-yd, capacity, traction or crawler type.

Pittsburgh

PITTSBURGH, Sept. 29.

MACHINE tool sales have been fewer the past week than in the one previous, but the appearance of a few fair-sized inquiries is encouraging. Besides the revised list for the machine shop of the Carnegie Steel Co. for its Homestead works, the Westinghouse Electric & Mfg. Co. has come into the market for a number of small tools for its Sharon transformer plant and there is also an inquiry for tools for a new plant to be built at Emeryville, Cal., by Hubbard & Co., Pittsburgh. An unnamed buyer has an inquiry out for 10 tools.

A good demand continues for rolling mills and equipment in a modernization program that involves the replacement of steam engines by motors for driving power. The Donner

Steel Co., Buffalo, is changing over its 40-in. blooming mills from steam to electricity and the order for the motor went to the General Electric Co. Electrical equipment for the new 40-in, blooming mill of the Wisconsin Steel Co., South Chicago, will be furnished by the Westinghouse Electric & Mfg. Co. The General Electric Co., will furnish two 2500 kw. three-phase, 60-cycle 2200-volt turbo generators, with a turbo-driven exciter set for the power plant of the Mingo, Ohio, works of the Carnegie Steel Co.

Contract has been let by the Fleming Tank Co., 3115 Liberty Street, Pittsburgh, to the Thomas Coutts Co., 3320 Smallman Street, for a one-story addition, 95 x 100 ft., estimated to cost \$45,000.

Elevating, conveying and other material-handling machinery will be installed in the five-story and basement terminal warehouse, 133 x 240 ft., to be constructed at Johnstown, Pa., by the Johnstown Terminal Warehouse Co., estimated to cost \$650,000. The William Steele & Sons Co., 1600 Arch Street, Philadelphia, is architect and engineer.

The Guyan Machine Shops, Logan, W. Va., machinery aler, have inquiries out for a wheel press, arranged for motor drive, 25 to 30 tons capacity.

The Central Glass Co., Fourteenth and McColloch Streets, Wheeling, W. Va., manufacturer of pressed and blown glass-ware, has tentative plans for an addition, estimated to cost \$50,000 with equipment. Cecil Fee is general manager.

The Reznor Mfg. Co., Mercer, Pa., manufacturer of gas stoves and heaters, has arranged for the installation of additional machinery for increase in output.

Manual training equipment will be installed in the threestory senior high school to be erected at Charleston, W. Va., estimated to cost \$800,000, for which it is expected to ask bids on a general contract in about 30 days. H. Russ Warne, Masonic Temple, is architect.

The Gem Mfg. Co., 1200 Goebel Street, Pittsburgh, manufacturer of metal stampings, cans, etc., has awarded general contract to D. T. Riffle, 1106 Forbes Street, for a one-story addition, 80 x 130 ft., including alterations and improvements in present factory, estimated to cost \$30,000. John F. worth, Commerce Building, Erie, Pa., is architect. Fownes is president.

The Standard Sanitary Mfg. Co., Bessemer Building, Pittsburgh, has plans under way for a five-story storage and distributing works on Galveston Avenue, Northside, site of the former Hall Pump Co. plant, estimated to cost \$85,000 with equipment.

Bids will be received until Oct. 10, by the Waterworks Commissioners, George C. Genscheimer, secretary, Erie, Pa., for one 12,000.330-gal. motor-driven, centrifugal pumping engine, together with auxiliary equipment. The J. N. Che ter Engineers, Union Bank Building, Pittsburgh, are in charge.

Indiana

INDIANAPOLIS, Sept. 29.

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m IDS}$ will soon be asked by the Cummings Vote Register Machine Co., Knox, Ind., for the erection of the first units of its proposed plant at Crown Point, Ind., estimated to cost \$350,000 with machinery. A power house will be built.

The Indiana Service Corporation, Fort Wayne, Ind., has arranged a bond issue of \$1,293,000, a portion of the proceeds to be used for extensions and improvements in power plants and system. Robert M. Feustel is president.

The Interstate Public Service Co., Indianapolis, will take over the municipal electric power plant and system at North Vernon, Ind., and will consolidate. The power station will be remodeled and new equipment installed for alternating

The Fibroe Insulation Co., Valparaiso, Ind., manufacturer of insulating sheets, rods, tubes, etc., will begin the erection of a one-story addition estimated to cost \$40,000 with equipment.

The Crane Co., 836 South Michigan Avenue, Chicago, in arranging to ask bids for its two-story and basement factory branch and distributing plant at Eighth and Walnut Streets, Evansville, Ind., 115 x 125 ft. A traveling crane will be installed. Shopbell, Fowler & Thole, Furniture Buiding, Evansville, are architects. R. E. Burget is local manager.

The Central Glass Co., Evansville, Ind., will rebuild the portion of its plant destroyed by fire, Sept. 23, with loss reported at \$200,000 including machinery.

The Board of Public Works, City Hall, Fort Wayne, Ind., will begin the construction of a one-story power house for municipal service, for which plans have been drawn by Charles Brossman, Merchants' Bank Building, Indianapolis, architect and engineer.

St. Louis

ST. Louis, Sept. 29.

N expansion program is being arranged by the Lacle A Cas Light Co., 1017 Olive Street, St. Louis, providing an expenditure of \$1,775,700 during the present fiscal year The work includes the installs \$1,600,000 in 1925. of gas producer equipment at the plant at 696 Catalau Street, with coke screening equipment, water-softening apparatus and other equipment for treating and pumping gas; installation of boilers, pumps, screening apparatus and other machinery at Station A, Rutger Street, and the con-struction of a 2,000,000 cu. ft. capacity gas holder at this location; by-products equipment, machinery for the ery of water gas tar, and 300,000 cu. ft. capacity gas holder at Station B, Main and Howard Streets. A one-story meter testing and repair works will be constructed at 4000 Forest Park Boulevard, to cost approximately \$300,000 including

The Tulsa Oxygen Co., 305 First National Bank Building, Tulsa, Okla., manufacturer of commercial oxygen, has tentative plans for the erection of new works at Springfield, Mo., estimated to cost \$125,000 with equipment.

The Twin City Ice Co., Little Rock, Ark., recently organized by Fred L. Sherman, 2124 State Street, plates the construction of a one-story ice-manufacturing plant, estimated to cost \$200,000. It is also proposed to build a plant at North Little Rock to cost about \$90,000.

R. W. Porter, Blackwell, Okla., is arranging a list of equipment for a proposed local electric light and power plant and will soon make purchases. It is planned also equip an ice-manufacturing plant, for which machinery will be purchased.

The Pierce Oil Co., Sand Springs, Okla., will build a machine shop in connection with extensions at its local refinery, the latter to include additional pressure stills, boiler equipment, 85-ft. smoke stack and other apparatus, to cost approximately \$1,000,000. William H. Coverdale is chairman of the board.

The Oklahoma Gas & Electric Co., Oklahoma City, Okla., has foundations in progress for the first unit of a two-story general service and repair works, 100 x 110 ft., estimated to cost \$200,000. A portion of the building will be equipped as a machine shop and another section given over to a service works for company motor trucks and cars. service works for company motor trucks and cars. J. F. Owens is general manager.

The Common Council, Columbia, Mo., has authorized the purchase of two 400-hp. boilers, stoker, centrifugal pumping equipment and other apparatus for the municipal

Milwaukee

MILWAUKEE, Sept. 29.

PRIVATE inquiry is being made by the Ajax Motors Co., Racine, Wis., for some special tool equipment, but it is not yet ready to proceed with the purchase of the bulk of its needs. A considerable part of the standard production tools is being derived from the liquidated stock of the Lafayette Motors Corporation at Milwaukee. The Ajax project is about the only interesting and sixable matter before the local trade. Some fair sales are being made from day to day, but business lacks snap.

The George J. Meyer Mfg. Co., 576 Clinton Street, Milwaukee, is inquiring for a crane and other miscellaneous items for a new storage building, 80 x 160 ft., one story, the general contract for which has been let to Charles B. Danielson, 185 Thirty-fifth Street. Equipment for a brass foundry addition has practically all been placed. A. H. Klenappel is consulting engineer.

The Federal Rubber Co., Cudahy, suburb of Milwaukee division of the Fisk Rubber Co., Chicopee Falls, Mass., is in the market for some additional equipment, both for the factory and the machine shop. Specifications are being made by George J. Mead, chief plant layout engineer. Arthur A. Frank is general manager.

The Rossmelssi-Wagner Motor Co., Appleton, Wis., is taking bids through Edward A. Wettengel, local architect, for sales and service building. the erection of a new garage, 120 ft., part two stories and basement, and costing about \$35,000 complete.

The Automatic File & Index Co., Green Bay, Wie., will build a \$60,000 addition, 90 x 120 ft., one story, and has let the general contract to Ludolf M. Hansen & Co., local. The architects are Foeller, Schober & Stephenson, Green Bay. Equipment for metal, wood and sheet metal working will be purchased. L. G. Straubel is general manager.

The Milwaukee Sewerage Commission, 578 Market Street, Milwaukee, is considering bids for the construction of a sludge storage building, requiring 600 tons of structural steel, tenders being opened Sept. 26. Traveling cranes, presses other equipment will be purchased. T. C. Hatton is chief engineer.

John Kittell, Bellin Building, Green Bay, Wis., let the general contract to the H. J. Selmer Co., local, for a three-story sales and service building, 100 x 110 ft., at 417-421 Main Street, for occupancy by the Fox River Motor Car Co. The work will cost about \$85,000, not including machinery.

Machine Postage Service, Inc., 110 North Fourth Street, La Crosse, Wis., organized with capital stock of \$250,000, over half paid in, will distribute stamp selling machines made by its manufacturing branch in De Kalb, Ill. The latter will be in the market for strip steel, 36-gage and lighter; also dyes, punch presses, spring wire, etc. W. H. O'Toole is one of the heads.

Detroit

DETROIT, Sept. 29.

BIDS will be asked in the near future by the Grand Rapids Railway Co., Ionia Street, Grand Rapids, Mich., for rebuilding its car barns and repair shop, recently destroyed by fire with loss reported at \$75,000. Williamson, Crow & Proctor, Gilbert Building, are architects.

The United States Register Co., Burchard Avenue, Battle Creek, Mich., manufacturer of warm air registers for sideand other service has tentative plans for a two-story addition. A. O. Jones is president.

The Holland Furnace Co., Bay City, Mich., will begin the ection of a one-story addition. Extensions and betterments erection of a one-story addition. will also be made in the existing plant. The work will approximate \$22,000.

The Wolverine Mfg. Co., Berrien Springs, Mich., manufacturer of motor truck bodies, has acquired the former factory of the Bowman Canning Co. The present works will be removed to the new location and additional equipment

The Dwight Lumber Co., River Rouge, Mich., has awarded a general contract to Jerome A. Utley, Penobscot Building, Detroit, for a two-story mill, 100 x 255 ft., estimated to cost \$100,000 with machinery. It will replace a plant recently destroyed by fire.

The Consumers Power Co., 288 West Main Street, Jackson, Mich., has preliminary plans for the construction of a one-story automatic power substation on Fulton Street, Grand Rapids, Mich., estimated to cost \$150,000. Work will begin early in 1925. Harold Foote is company engineer.

The Board of Education, Iron Mountain, Mich., plans for the installation of manual training equipment in the new high chool estimated to cost \$140,000. A general contract for building has been let to the Phelps-Drake Co.

The Dennis Concrete Products Co., 12839-87 Whitcomb Avenue, Detroit, organized with \$60,000 capital stock, is planning to erect a factory and will be in the market for concrete machinery. J. D. Wilson is secretary-treasurer.

Gulf States

BIRMINGHAM, Sept. 30. PLANS will be drawn for a one-story municipal P and repair shop at Miami, Fla., for which the City Council has authorized an appropriation.

The Transcontinental Oil Co., Benedum Trees Building, Pittsburgh, Pa., an interest of the Benedum Trees Oil Co., same address, has plans for extensions in its oil refinery in the Fort Worth, Tex., district, estimated to cost \$500,000 with equipment. It is reported to be considering the instal-lation of a new pipe line from the oilfields to the Gulf Coast, to cost approximately \$1,500,000. J. C. McDowell, company headquarters, is engineer.

Peabody, Houghteling & Co., 38 Wall Street, New York, and Chicago, investment bankers, are said to be financially interested in a project for the construction of a paper mill at Texas City, Tex., where under the direction of the same banking interests a sugar refinery, costing \$5,000,000, recently was completed. The proposed paper mill will be devoted to the production of kraft papers, and with machinery and power house will cost \$2,000,000.

The Board of Aldermen, Cheneyville, La., will receive bids until Oct. 20 for equipment for an electric light plant, waterworks and ice-manufacturing plant, including two crude oil engines, direct-connected to electric alternators; elevated tank and towers; cast iron pipe, fittings, etc.; auxiliary electric equipment; and complete 5-ton ice-manufacturing plant. F. P. Joseph, Glenmora, La., is consulting engineer. J. B. Everitt is city clerk.

The Grayburg Oil Co., Maverick Building, San Antonio, Tex., will begin the construction of a pipe line from Luling, Tex., to San Antonio, about 30 miles, with pumping stations, estimated to cost \$250,000. It operates a refinery at the last noted place.

Fire, Sept. 17, destroyed a portion of the woodworking and crate manufacturing plant of the Wauchula Develop-ment Co., Wauchula, Fla., with loss estimated at \$150,000 including equipment. It is planned to rebuild.

Garland Kent and J. E. Butler, Corsicana, Tex., formerly connected with the Pure Oil Co., have secured a controlling interest in the Corsicana Oil & Refining Co., First National Bank Building, Corsicana, Tex. The new owners will take immediate possession and plan improvements in the refinery, now idle for about two years. Mr. Kent is president of the new company; J. E. Butler, vice-president; and C. A. Middleton, secretary and treasurer.

Elevating, conveying and other freight-handling machinery will be installed in the new terminal warehouse and distributing plant to be erected at Good and Pacific Streets, Dallas, Tex., by the Texas & Pacific Railway Co., Texas and Pacific Railway Building, estimated to cost \$500,000 with equipment. E. F. Mitchell is chief engineer for the company.

The People's Ice Mfg. Co., Sebring, Fla., will make extensions and improvements in its local plant, with the installation of additional equipment to triple, approximately, the present output. T. W. Lawton is president.

The Jackson Motor Co., 1211 McFaddin Street, Beaumont, Tex., has awarded a general contract to Herman Weber, Perlstein Building, for a one and two-story service, repair and garage building to cost \$90,000.

The Lampasas Ice & Refrigerating Co., Lampasas, will build a new refrigerating plant, installing additional equip-ment for larger output in all departments. The present The present plant will be continued.

South Atlantic States

BALTIMORE, Sept. 29.

TENTATIVE plans are being considered by the Golding & Sons Co., Wilmington, Del. & Sons Co., Wilmington, Del., producer of potters' flint, feldspar, etc., for rebuilding the portion of its mill on Christiana Avenue destroyed by fire Sept. 19 with loss estimated at \$50,000, including equipment. The crushing works and machine shops sustained the bulk of the loss. Headquarters are at East Liverpool, Ohio.

Elevating, conveying and other material-handling machinery, power equipment, etc., will be installed in the eight-story and basement distributing plant to be erected on an 111/2-acre tract on the Lincoln Highway, Baltimore, by Montgomery, Ward & Co., Chicago Avenue and Larr Street, Chicago, operating a mail order business, for which a general contract has been let to the Wells Brothers Co Monadnock Building, Chicago, estimated to cost \$2,000,000 with equipment.

The general purchasing agent, Panama Canal, Washington, will take bids until Oct. 10 for 6 wood tackle blocks, 75 pipe unions, 62 globe valves, 24 angle valves, 50 gate valves and other equipment, circular 2360.

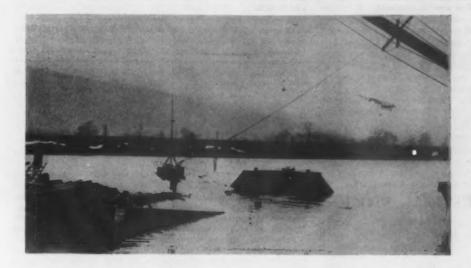
The Potomac Electric Power Co., 231 Fourteenth Street, Washington, has awarded a general contract to Frank Davis, Inc., Machinists' Building, for extensions in its two-story automobile service, repair and garage building, 60 x 600 ft., estimated to cost \$50,000 with equipment. A. B. Heaton, 1211 Connecticut Avenue, N. W., is architect.

R. P. Johnson, Wytheville, Va., machinery dealer, inquiries out for a 75-hp. boiler, locomotive type, on skids, and accessory apparatus.

The Cofac Mfg. Co., 219 Chestnut Street, Berkley, Norfolk, Va., has inquiries out for an electric dynamo, suitable for galvanizing, with meters, field rheostat and accessories.

The Bureau of Supplies and Accounts, Navy Department, Washington, will take bids until Oct. 21 for one electric-operated hoist and spare parts for the Puget Sound Navy Yard, schedule 2718; until Oct. 14, for 700 ft. black steel pipe, and 1200 ft. seamless steel tubing, for the same yard, schedule 2691; for 9195 lb. seamless copper tubing, 21,900 lb. seamless brass pipe, for Western yards, schedule 2692; for 23,400 ft. wire rope, for the Mare Island and Puget Sound yards, schedule 2699; until Oct. 7 for 1000 crucibles, size 150, for the Norfolk yard, schedule 2710; for 2275 lb. sheet brass, for the Norfolk yard, schedule 2716.

Barr & Dougherty, Inc., Elsmere, Wilmington, Del., manufacturer of greases, tallow, etc., is considering the rebuilding of the portion of its plant destroyed by fire Sept. 14, with loss estimated at \$200,000 including machinery, power equipment, etc.



THE Use to Which a Lifting Magnet May Be Put Is Indicated in the Accompanying Illustration Showing a 45-In. Round Mill Type Magnet Made by the Ohio Electric & Controller Co., Cleveland, Salvaging Pig Iron from a Sunken Barge in Lock No. 9 of the Eric Canal, 10 Miles West of Schenectady, N. Y.

The Linde Air Products Co., 30 East Forty-second Street, New York, is said to have taken title to property at Norfolk Avenue and Fourteenth Street, Roanoke, Va., as a site for a new branch plant, 150 x 225 ft., to cost \$200,000 with equipment.

The Virginia Portland Cement Co., Norfolk, Va., a subsidiary of the International Cement Corporation, is preparing to begin the construction of an addition to its local mills, to include complete remodeling, new buildings and the installation of machinery to develop an annual output of 1,000,000 bbl., estimated to cost \$1,500,000. The company will also develop its raw material properties at Chuckatuck, Nansemond County, including the installation of loading, conveying and other machinery. A mechanical washing plant will be installed at the Norfolk mills. Headquarters of the parent company are at 342 Madison Ávenue, New York.

The Wilson-Hock Co., City Point, Va., machinery dealer, has inquiries out for an 80-kw. motor-generator set, with motor, three-phase, 60-cycle, 2300 volts, 100 to 115 hp.; generator to be 550 to 600 volts, with exciter; also for two 25-hp. motors, with one extra armature; a 100-hp. motor, three-phase, 60-cycle, 550 volts, complete with starting equipment; one or more coal mining machines, 6%-ft. cover, 50-hp., 36-in., Goodman or similar type.

The Taylor-Parker Co., Water Street and Commerce Place, Norfolk, Va., is in the market for a standard gage locomotive, from 12 to 15 tons.

Pacific Coast

PROPERTY has been acquired at Forty-eighth Street and San Pablo Avenue, Oakland, Cal., by the Eagle Body Mfg. Co., 501 South Market Street, San Jose, Cal., for a new plant to manufacture automobile bus and commercial bodies, for which plans will soon be drawn. It is expected to cost about \$50,000 with equipment. Harry Sibley is manager.

The Merchants Ice & Cold Storage Co., San Francisco, will begin the construction of a six-story and basement ice and cold storage plant at New Montgomery and Lombard Streets, estimated to cost \$145,000 with machinery. W. Toriggino, Mills Building, is architect and engineer.

The Freeland Table Co., Astoria, Ore., has awarded a general contract to Rohaut & Gearhart, Astoria, for a new one-story plant to cost \$30,000.

The Seibel Air Spring Seat Co., Santa Barbara, Cal., has awarded a general contract to Arvid Sjolin, 109 North Milpas Street, for a new plant at 424 Salsipuedes Street, to manufacture automobile equipment, estimated to cost \$25,000.

The Pacific Lock Joint Pipe Co., Seattle, has acquired 5 acres at East Oakland, Cal., and contemplates the erection of a branch plant for the manufacture of concrete pipe and culverts, estimated to cost about \$50,000 including machinery.

The California Salt Co., Alvarado, San Francisco Bay, Cal., has issued bonds for \$375,000, the majority of the proceeds to be used for the erection of a new refinery with a capacity of 200 tons per day. Other extensions will also be made. L. D. Adams is president.

The D. V. O. Co., Modesto, Cal., recently organized by Norman De Vaux, head of the Star Motor Co. of California. and associates, has acquired the local plant of the California Sorghum & Syrup Co., and will remodel for the manufacture of lime and barium products, fertilizers, etc. Considerable additional machinery will be installed. It is expected to have the plant ready for service early in the coming year. C. E. Gilman is mining engineer for the company.

The Crown-Willamette Paper Co., West Linn, Ore., contemplates the erection of an addition to its mill, to cost \$100,000 with equipment. J. C. Tindsley is superintendent of construction.

The Pacific Electric Mfg. Co., 827 Folsom Street, San Francisco, is completing plans for a new one-story factory at Keith and Donner Avenues, to cost \$50,000 with equipment. George H. Wienmeyer, 57 Post Street, is engineer.

The American Oil Separator, Inc., Los Angeles, organised with capital stock of \$400,000 to operate an oil refinery, will build a plant with a capacity of 15,000 bbl. per month. It will be in the market for boilers and general machinery. No awards have been made as yet. J. Sanford Wilson is secretary. Address care of O. O. Clark, 1400 Charles C. Chapman Building.

Canada

TORONTO, Sept. 29.

MACHINE tool sales the past week compare favorably with previous weeks. While the majority of orders are for one or two tools, larger lists are making their appearance from time to time. Buying on new works account is more active and several large plants are under construction for which equipment will be purchased later. A good demand of a diversified nature is reported on replacement account. Orders for electrical machinery have been quiet, but builders of this class of equipment state that business the first six months of this year was well ahead of that for the corresponding period a year ago and that a considerable amount of machinery on this account is now under construction in Canadian shops. The automotive industry is furnishing a good demand for tools.

W. S. Fenwick & Sons, Enterprise, Ont., are asking for a small lathe and drill press.

The Universal Steel Wheel Corporation, Walkerville, Ont., is establishing a plant for the manufacture of disk wheels and automobile accessories and is interested in complete equipment. R. H. Hodson, Big Beaver, Mich., is purchasing agent

P. Papette & Co., Penetanguishene, Ont., are in the market for a lathe, drill, and complete tools for a machine shop.

The Hillside Garage Co., Schofeld Avenue, Brockville, Ont., is asking for tools and machinery for a garage and auto repair shop. W. H. Firth is purchasing agent.

The plant of the Maritime Electric Co., St. Stephen, N. B., was destroyed by fire with a loss to building and machinery of \$200,000.

The Adamson Mfg. Co., Somerset Street, Hamilton, Ont., is completing plans for an addition to its factory.

The McNamara Motor Wheels, Ltd., St. Mary's, Ont., contemplates the erection of a plant and is interested in prices and information on complete equipment. B. E. Seymour, Water Street South, is business manager.

J. A. Robertson, Walkerville, Ont., representing the Dodge Brothers Motor Co., Ltd., states that his company has definitely decided to locate an assembling plant in Toronto. The building formerly occupied by Canadian Aeroplanes, Ltd., on Dufferin Street, is being considered. It is expected that about 300 men will be employed. The Dodge Brothers Motor Co. has taken out supplementary letters patent to increase the capital stock from \$100,000 to \$1,000,000, also for the purpose of changing the name of the company from that of Dodge

Brothers Motor Co., Ltd., to that of Dodge Brothers (Canada), Ltd.

Western Canada

The B. C. Valve Co., 514 Standard Bank Building. Vancouver, B. C., has secured a site adjoining the Massey-Harris Building on Main Street, in the False Creek industrial area, Vancouver, where it will erect a plant to cost \$30,000. It will include a machine shop and foundry, tool room, fettling and plating rooms, etc. Equipment has not yet been purchased.

Construction has started on a pump house at the new Government drydock at Skinner's Cove, B. C., and bids will shortly be called for three drydock gates and the installation of machinery.

STEEL AND INDUSTRIAL STOCKS

The range of prices in active steel and industrial stocks from Monday of last week to Monday of this week is as follows:

Low	High	Low	High
Allis-Chalmers 60%	631/2	Int. Har 94%	9534
Allis-Chalmers pf. 99%	100	Int. Har. pf1101/3	1111/2
American Can1271/2		Jones & La'lin pf.11314	11314
American Can pf.1131/2		Lima Loco 601/4	611/4
Am. Car & Fdy. 165		NatAcme 51/2	5 %
Am. C. & F., pf120	120	Nat. En. & Stm 201/2	221/2
American Loco 79%	811/2	N. Y. Air Brake, 41%	44%
Am. Radiator 116	119	Otis Steel 71/2	71/2
Am. Steel Fdries, 36%	3734	Otis Steel pf 46%	48
Am. St. Fdries. pf.106	106%	Pressed Steel Car 45	46
Baldwin Loco121%	124 %	Pressed Steel pf 73	731/2
Bethlehem Steel 4274	45 %	Replogle Steel 10%	12%
Beth. Stl. 7% pf., 93%	9316	Republic 451/4	481/4
Beth. Stl. 8% pf107	1071/2	Republic pf 85%	85 %
Br. Em. Steel 2%	234	Sloss-Sheffield 73	74 %
Br. Em. Stl. 1 pf. 32%	32 %	Steel of Canada 79	80
Chic. Pneu. Tool. 861/2	861/2	Un. Alloy Steel., 23	23
Colorado Fuel 411/4	4514	U. S. Pipe1071/2	115
Crucible Steel 55 1/2	571/2	U. S. Pipe pf 951/2	97
Crucible Steel pf. 90	901/8	U. S. Steel107%	109%
Deere pf 73	74	U. S. Steel pf1221/4	1223/4
General Electric 260	26634	Vanadium Steel 25	26%
Gt. No. Ore Cert 29	293/4	W'house Air Br., 93%	95
Gulf States Steel. 72%	74%	Youngstown S.&T. 67%	68
Inland Steel 35%	36		

Industrial Finance

The annual report of the National Steel Car Corporation, Hamilton, Ont., for the year ended June 30, 1924, shows surplus profits of \$358,381, as compared with a net loss of \$118,013 for 1923. Net profits for the year were \$608,814, as compared with \$142,887 in 1923. Adding \$358,381 to the surplus brought forward, \$2,395,937, the total was \$2,754,318. Surplus carried forward after deductions was \$2,396,250. In his report to shareholders, Robert J. Magor said: "The increased efficiency of your works during the last fiscal year was quite marked and, reflected in the statement, shows a distinct improvement over any previous year in your corporation's history, in spite of the fact that there was not a sufficient amount of business available to permit operating at more than a small percentage of actual capacity."

The Hydraulic Steel Co., Cleveland, earned a profit of \$269,767, available for interest during the eight months' period up to June 30, under its receivership, according to a report filed under United States District Court by Thomas P. Goodbody, the receiver. Net sales for the period amounted to \$3,936,079. The deficit on June 30 was \$3,559,603.

The National Acme Co., Cleveland, plans a reduction of capital stock from \$25,000,000 to \$5,000,000, reducing the par value of the 500,000 shares outstanding from \$50 to \$10. A special stockholders' meeting has been called for Oct. 24 to consider the proposed reduction. In a letter sent to stockholders President A. W. Henn announced the recent sale of equipment and inventory at the Montreal plant, the closing of its Boston and Buffalo offices and the consolidation of the Cleveland operations under one roof at the Coit plant. It is stated that operating expenses have thus been reduced materially, but that manufacturing facilities have not been curtailed except by the loss of the Montreal plant. The proposed reduction in capital stock will result in the saving of \$30,000 yearly in corporate taxes.

Recession of business during the last few months is held responsible for an equity action in Federal District Court to conserve the assets of Barnes & Irving, Inc., 203 Walton Street, Syracuse, N. Y., dealer in mill supplies and machinery. F. R. Gilfool, local accountant, has been designated as receiver. Action was started by the Bay State Tap & Die Co., Boston, on a claim of \$3,100. The assets of the company are listed as \$60,000, with liabilities between \$50,000 and \$55,000.

In the annual report of the Pullman Co., Chicago, for the year ended July 31, net income of \$7,698,636 is shown. Manufacturing operations produced \$7,904,426 of business up to May 31, at which time that branch passed into the hands of a subsidiary, the Pullman Car & Mfg. Corporation. Hence, earnings for the last two months from this branch are not included. Gross business was the largest in the company's history.

Directors of the Fafnir Bearing Co., New Britain, Conn., will recommend to stockholders an increase in the company's capitalization from \$1,500,000 to \$3,000,000 by the payment of a 100 per cent stock dividend.

The Magee Furnace Co., Boston, has reduced the par value of its common shares from \$100 to \$50, and increased the issue to 10,000 shares, the new stock to be distributed as a stock dividend in the ratio of four new shares for each old share held. In addition to the common stock capitalization the company has \$300,000 first preferred, \$200,000 second preferred and \$62,500 special stock outstanding.

For the second time this year the Falcon Steel Co., Niles, Ohio, has omitted its quarterly dividend on common stock. The company has declared, however, the regular quarterly payment of \$1.75 per share on preferred stock, payable Oct. 1 to stock of record Sept. 20.

The American Chain Co. reports net earnings of \$514,851 for the first six months of 1924, after all expenses, taxes and reserves for interest and depreciation. Operating income amounted to \$1,271,279, after Federal taxes, against \$2,392,218 for the same period last year. Net income for the first six months of 1923 was \$1,718,403. The general balance sheet as of June 30 showed net current assets of \$12,775,918 as compared with \$13,192,472 last year.

Plans of New Companies

The Poindexter Engineering Co., New York, has been incorporated with capital stock of \$500,000 to manufacture equipment for sewage disposal. Plans are under way but detailed information is not available at this time. G. B. Nicholson heads the company. Address in care of Jeffery & Redmond, 14 Wall Street.

The Liberty Electric Corporation, New York, incorporated with capital stock of \$200,000 and 10,000 shares of no par value stock, plans to manufacture and distribute electric equipment. More definite information regarding operating plans may be obtained by writing in care of C. A. Levy, 110 William Street.

The Progressive Auto Repair Shops, Inc., 737-47 Fourth Avenue, Brooklyn, has been incorporated with capital stock of \$50,000 to operate a general machine and repair shop, having purchased a number of shops which will be placed in operation as soon as possible.

The De Lon Corporation, Ballston Spa, N. Y., recently organized, has purchased the foundry of the Davison-Namack Co., that city, and will manufacture steam and hot water boilers for domestic use. The plant also has equipment for commercial work, the former owners having done work for the General Electric Co., Schenectady, N. Y. Production will be started immediately.

The S. H. Sanborn Engineering Co., 123 East Main Street, Middletown, N. Y., has been organized as contractor in heating and ventilating equipment and to act as distributor of boilers, furnaces, pumps, air compressors, radiators, blowers, gas producers, etc. S. H. Sanborn heads the company.

The Bramley Machinery Corporation, 527 Fifth Avenue, New York, has been organized to develop patents on labor-saving machinery, but much preliminary work is still to be done and plans are not expected to take shape before February. S. Bramley-Moore is president. The Bower Mfg. Co., 305 Niagara Street, Utica, N. Y., incorporated with capital stock of \$100,000, will continue an established business in the manufacture of spiral bed springs. Its plant, situated on a plot 80 x 300 ft., will be enlarged in the near future. J. J. Bower is president; D. R. Rood, secretary, and J. A. Bower, treasurer.

Hooser & Martin, Inc., 911 Southwestern Life Building. Dallas, Tex., has been organized to manufacture oil well appliances. Its capital is \$20,000, all paid in. J. W. Hooser, president-treasurer, and W. R. Martin, vice-president, are the heads.

The Brown Iron Co., Pittsburgh, recently incorporated, is at work on organization plans, but matters have not progressed to the point where announcement can be made. Plans will be outlined in this column later. McCleane Brown, manager of iron sales for the Pittsburgh Steel Supply Co., 1009-15 Beaver Avenue, North Side, Pittsburgh, is connected with the new organization.

Tractor Appliances, Inc., Park Building, Pittsburgh, has been organized to manufacture ground boring apparatus. Work has been contracted with the Ricks Mfg. & Supply Co., Uniontown, Pa.

The Ideal Adjustable Draw Bar Co., Meyersdale, Pa., recently incorporated under Pennsylvania laws with capital stock of \$25,000, will take over a company of the same name conducted as a partnership. The company is engaged in the manufacture of an adjustable bar for the Fordson tractor, which has been on the market for about two years. A plant is under lease and is fully equipped for present requirements. The company later expects to be in the market for a milling machine, a multiple drill, an engine lathe and some small tools next year. Officers are Eli G. Shockey, president: George G. Cross, vice-president, and George Westmiller, secretary-treasurer.

Officials of the Okonite Co., Canal Street, Passaic, N. J., manufacturer of wires, cables, etc., for electrical service, have formed the Okonite-Callender Cable Co., Inc., under state laws, with capital of \$1,000,000, to manufacture a similar line of cable equipment as well as other electrical products. The new company has acquired a large portion of the former iron and steel works of the Gillespie-Eden Corporation, Market Street, Paterson, N. J., and will remodel and improve it for its business. Equipment will be installed at an early date. It is said that the present Okonite works will be continued as heretofore and that the new company will not affect this interest in any way excepting to add to its business.

The Export Mfg. Co., care of William Newcorn, 220 Park Avenue, Plainfield, N. J., organized with capital stock of \$125,000, will manufacture motor trucks principally for export. Its organization is not yet complete.

The White Portland Cement Co., 902 National City Bank Building, Los Angeles, Cal., has been organized with \$3,000,000 capital stock to operate a cement mill. It will manufacture a number of products. Permanent offices have not been established but plans will be pretty definitely known in about two months. Lewis Cruickshank is one of the principals.

The Regent Steel Co., East Eightieth Street and Bessemer Avenue, Cleveland, has been organized to deal in new finished steel products, sheets, plates, strip steel, bars, structural steel and railroad supplies. It will be under the management of the Rotter-Speer Co., Cleveland, of which A. Rotter is president.

The Kustombilt Radio Corporation, Alamac Hotel, New York, has been incorporated with \$100,000 capital stock to operate as a distributing center for various radio equipment. J. K. and F. J. Sprague head the company.

The Cross Motor Corporation, New York, incorporated with \$300,000 capital stock, is considering the manufacture of automobiles and parts, but plans have not taken definite shape as yet. David M. Milton and Stephen H. Hammond are the incorporators. Temporary address is in care of Ellery C. Huntington, 27 William Street.

The Globe Radio Products Corporation, 53 Church Street, New Britain, Conn., has been organized with \$10,000 capital stock, all paid in, to manufacture radio products. Howard L. Bitter is president, Avelon G. Russell, vice-president; Kelsey F. Lingo, secretary, and Isadore M. Goldstein, treasurer.

The plant of the Galena Foundry & Machine Co. has been purchased by Clyde S. Powell, who formerly was connected with Babb & Powell Co., Pitcher, Okla. Mr. Powell will engage in handling machinery and in making repairs to equipment

The Pemberton Carbon Cleaning Machine Co., Gainesville, Fla., organised with authorised capital of \$200,000, will manufacture carbon-removing apparatus. Designs are not yet complete, but as soon as this work is cleared away, plans will be considered to manufacture by contract, provided the

parts can be done satisfactorily. W. E. Baker is secretary-treasurer.

The Standard Engineering & Mfg. Co., Pittsburgh, organized with capital stock of \$5,000, later changed to \$50,000, will manufacture and install vacuum systems for heating and drying. No construction is contemplated at this time. H. E. Gambill is one of the principals.

The Fretwell Safety (Locked) Razor Corporation, Danville, Va., has been organized with \$1,000,000 capital stock and will manufacture a new type of locking rasor. It is intended to locate the works at Richmond, Va., and plans for the erection of buildings will be considered, but not for several weeks. Julian W. Fretwell, secretary-treasurer Merchants Supply Co., Danville, who heads the new company, states that factory and equipment will be the most modern and complete.

The Sykes Co., Liberty Central Trust Building, St. Louis, incorporated with \$1,000,000 capital stock, will manufacture gasoline driven rail cars for passenger service. It is identified as the company by that name organized 18 months ago. Bodies are built by the St. Louis Car Co., truck, driving mechanism, etc., being built by the Sykes Co. It has under construction equipment for several large railroad lines. A. M. Russell is vice-president.

The St. Clair Oil Burner Corporation, 5648 Delmar Boulevard, St. Louis, has been organized to act as exclusive agent for St. Clair oil burners in the United States. J. D. Sayer is vice-president and general manager.

The Claypool Sweeper Co., Claypool, Ind., incorporated with capital stock of \$10,000, has begun operations in the manufacture of sweeping appliances. It uses quantities of steel tubing. Charles M. Youart is one of the principals.

The Pauley & Haber Co., 1411-17 Brighton Road, Pittsburgh, organized with capital of \$5,000, will manufacture tinware, riveted pipe and do sheet metal work, light and heavy stamping. It has taken over the tinware department of the Grier Brothers Co. at the above address and is now active. F. Pauley is one of the heads.

The Ra Dex Gas Heater Co., Kalamasoo, Mich., has been organized with capital of \$25,000 and has begun production on a special type of gas heater. All parts are brought and assembled in the company's plant. It has a New York office at 44 Murray Street, J. P. Conroy in charge.

The Davidson Plow Co., Evansville, Ind., incorporated with capital stock of \$75,000, has taken over the business of the Davidson Dietrich Plow Co. and the W. F. Hartig Plow Co. It will manufacture plows and other lines of farm implements. Harry R. Davidson heads the company.

The Hubbard Hot Plate Co., 330 Columbia Street, Utica. N. Y., has been organised with capital stock of \$50,000 to manufacture gas plates. Operations are under way. L. G. Fowler is one of the principals.

The Couple Gear Electric Truck Co, 1450 Buchanan Avenue, S. W., Grand Rapids, Mich., has been organized to acquire the business which has been conducted for 15 years as the General Devices & Fittings Co. The new company will manufacture trucks and automotive parts.

With an effort to develop further the electric furnace business in France and French possessions, La Compagnie Francaise Wild-Barfield has been formed with offices at 102 Rue Faubourg, Poissonniere, Paris. E. P. Barfield, one of the principals, is managing director of the Automatic & Electric Furnaces, Ltd., 173 Farringdon Road, London, E. C. 1.

Ernest N. Humphrey, for the past 20 years associated with Traut & Hine Mfg. Co., New Britain, Conn., and vice-president of the company, has purchased the household specialty business of that concern. He proposes to organize a new company to manufacture these products and will sever his connection with the Traut & Hine company Oct. 1. His purchase includes tools, fixtures and machinery. The new company will probably be located in New Britain.

The Carpenter Steel Co., Reading, Pa., has opened an office and warehouse at 633 Fulton Street, Indianapolis, with a complete stock of high-speed steel, carbon tool steel and drill rods. H. J. Joyce, Jr., is in charge.

The name of the Sherritt & Stoer Co., Inc., Philadelphia, has been changed to the Stoer Machinery Co., Inc., which will continue operations at 2006-8 Market Street. Personnel remains the same, with C. H. Stoer as president and C. R. Weber, treasurer. The sales force is under the supervision of W. C. Chapman, who assumed charge of sales Sept. 15. Mr. Chapman was associated with Manning, Maxwell & Moore, Inc., for the past 16 years as district manager of the Philadelphia office.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing or-ders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of items the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of The Iron Age, under the general heading of "Iron and Steel Markets" and "Non-Ferrous Metals."

Bars, Shapes and Plates	Brass Sheet, Rod, Tube and Wire
Bars: Per Lb. Refined iron bars, base price 3.24c. Swedish charcoal iron bars, base6.75c. to 7.25c. 5.25c. Soft steel bars, base price 3.24c. Hoops, base price 4.49c. Bands, base price 3.99c. Beams and channels, angles and tees, 3 in. x ¼	High brass sheet .16%c. to 18%c. High brass wire .17%c. to 18%c. Brass rods .14%c. to 15%c. Brass tube, brazed .24%c. to 25%c. Brass tube, seamless .21 c. to 22 c. Copper tube, seamless .22%c. to 23%c.
in. and larger, base	Sheet copper, hot rolled, 20%c. to 20%c. per lb.
hese 3.24c.	base.
Steel plates, ¼ in. and heavier3.34c.	Cold rolled, 14 oz. and heavier, 3c. per lb. advance
Merchant Steel Per Lb.	over hot rolled.
$\begin{array}{llllllllllllllllllllllllllllllllllll$	Bright Tin Grade "AAA" "A" Charcoal 14x20 14x20 14x20 12.85 10.85 1XX . 12.85 1XX . 15.75 13.85 1XXXX . 17.00 15.05 1XXXX . 11.25 11.10 1XXXX . 11.25 11.10 12.85 1XXX . 11.25 13.85 1XXX . 11.25 13.85 1XXX . 11.25 13.85 1XXX . 11.25 13.85 1XXXX . 11.25 13.85
Special tool steel	8 lb. coating, 14 x 20
Sheets	100 lb
Blue Annealed Per Lb. No. 10 3.89c. No. 12 3.94c. No. 14 3.99c.	IX
No. 164.09c.	Straits, pig
Box Annealed—Black	
Soft Steel C. R., One Pass Per Lb. Per Lb. Nos. 18 to 204.30c. to 4.45c.	Lake ingot
Nos. 22 and 24 4.45c. to 4.60c. 5.10c. No. 26 4.50c. to 4.65c. 5.15c. No. 28* 4.60c. to 4.75c. 5.25c. No. 30 4.70c. to 4.95c.	Casting
No. 14 Galvanized Per Lb. No. 16 4.70c. to 4.85c. Nos. 18 and 20 5.00c. to 5.15c. Nos. 22 and 24 5.15c. to 5.30c. No. 26 5.30c. to 5.45c. No. 28* 5.60c. to 5.75c. No. 30 6.10c. to 6.25c.	American pig lead
*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb. Welded Pipe Standard Steel Wrought Iron	Babbitt Metal Best grade, per lb
## in. Butt —41 —24 ## in. Butt —4 +19 ## in. Butt —11 +9	Antimony Asiatic
1-3 in. Butt48 -34 1-11/2 in. Butt14 + 6	Aluminum
2½-6 in. Lap	No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb36c.
Bolts and Screws	Business is quiet and the market uncertain. Deal-
Machine bolts, cut thread, 50 to 60 and 10 per cent off list	ers' buying prices are as follows:
Carriage bolts, cut thread.	Per Lb.
40 to 40, 10 and 10 per cent off list Coach screws, 50 and 10 to 65 per cent off list Wood screws, flat head iron, 75, 20 and 10 per cent off list Steel Wire	Copper, heavy crucible 11.00 Copper, heavy wire 10.50 Copper, light bottoms 9.00 Brass, heavy 6.50 Brass, light 5.00 Heavy machine composition 8.00
BASE PRICE* ON NO. 9 GAGE AND COARSER Per Lb. Bright, basic	No. 1 yellow brass turnings. 7.00 No. 1 red brass or composition turnings. 7.50 Lead, heavy 6.75 Lead, tea 5.00 Zinc 3.75 Cast aluminum 16.00
- Seam exitue for lighter gage,	Sheet aluminum16.00